

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper

Second-class postage paid at Boston, Mass., and additional mailing offices

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year

March 5, 1975

Vol. IX, No. 10



OW Photo by V. Farmer

Computerworld launched its 1975 Computer Caravan in Atlanta last week with minicomputer, communications and terminal companies, among others, demonstrating their equipment. This week the Caravan is in Philadelphia. Coverage on the Atlanta Caravan continues on Pages 4, 5 and 6.

Needed Less Complexity

Railway Dumps IBM Data Base System

By Patrick Ward
Of the CW Staff

ATLANTA—After a three-month trial period with an alternative data base management system (DBMS), Southern Railway Systems has decided to scrap its IBM IMS package, according to Dr. William E. Linn, the data base project advisor for the carrier.

Less complexity and great ease of use were the chief advantages which led the railway to opt for the Cullinane Corp.'s IDMS data base management system, he told a Computer Caravan session here last week.

Southern tried IMS in a pilot program a year ago, but will soon permanently shift the DBMS function to IDMS and the scheduling function to a communications monitor.

Southern's programmers agreed IDMS is much easier to use than IMS, Linn said. Data base design also proved easier, he commented, and programmer productivity jumped.

In addition, IDMS has a network organization which gives it more flexibility than the hierarchical organization of IMS.

he said. Linn noted it requires much less disk space.

Conversion of IDMS to the railway's pilot project took only about three weeks, Linn said, adding "we expect to phase in IDMS to replace our own software soon."

The shop also plans to use a communications monitor to replace IMS in handling the scheduling function, since IMS was found to be uneconomical for that here last week.

(Continued on Page 4)

By E. Drake Lundell Jr.

Of the CW Staff

ATLANTA Data processing is "an emergent profession at best," making any proposals to license practitioners in the field "premature," Fred Harris, vice-president of the Institute for the Certification of Computer Professionals (ICCP), told Computer Caravan attendees here last week.

Data processing today meets few of the criteria sociologists have established to

use alone, Linn said.

When the railway company first developed its car movement system several years ago to keep track of railway cars, it relied on in-house programming, according to the project advisor.

Describing Southern's system, Linn noted customers currently use teletype writers to inquire where individual cars or fleets of cars are. The railway's staff uses

(Continued on Page 6)

DP Too Young for Licensing, ICCP Officer Says

define a profession, Harris noted, adding that professionals should be oriented toward community interest and have both specialized and general knowledge, a high degree of self-control over behavior and a system of rewards for services.

DP does not yet have an established educational program that is accepted widely, and the curriculum development has been very limited, he noted.

At the same time, the only existing examination to certify people in the business is "not widely respected by the industry and public alike," he added.

Furthermore, only a few limited ethical codes exist in the business, and the enforcement procedures for those codes are either nonexistent or unused, he said.

"For these reasons, DP is not recognized as a profession," Harris said.

Distinction Must Be Made

Harris said a distinction has to be made between certification and licensing, pointing out certification is a voluntary program operating within a peer group, while licensing is a governmental action that can be used solely for a revenue measure or as a method of limiting the work force.

"One would hope," however, that a strong, well-run certification program could be used as a prerequisite to any licensing developed in the future, Harris added.

But for this to happen, a great deal of work needs to be done, he said, to establish the tests required for certification.

In this area, the ICCP is working to revise the Certificate in Data Processing (CDP) program to increase its credibility. The institute will be working with professional testing organizations to get advice

on the structure of the program, he said.

Future needs will require different exams for different levels in the business, Harris said, from entry-level testing to self-assessment and recertification for practitioners in the field.

In addition, there is a need to link a job function with the certification process, he asserted, so people can be tested differently depending on their various functions or industry specialties.

A curricula should be developed that divides the body of knowledge in the field into modular increments, and then a certification program could be developed along those lines with modular testing.

But no testing program alone can determine whether DP will become a profession, Harris indicated.

DP practitioners "will be the ones who tell if we're going to become a profession," Harris said. To become a profession will take commitment on the part of all in the business, he added.



OW Photo by V. Farmer

Fred Harris



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Second-class postage paid at Boston, Mass., and additional mailing offices. Published weekly (except a single combined issue for the last week in December and the first week in January) by Computerworld, Inc., 797 Washington St., Newton, Mass. 02160. © 1975 by Computerworld, Inc. All rights reserved.

50 cents a copy; \$12 a year in the U.S.; \$20 a year for Canada and PUAS; all other foreign, \$36 a year. Four weeks notice required for change of address.

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Computerworld can be purchased on 35mm microfilm in half-reels (Microfilm Circulation) through University Microfilms, Periodicals Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700.

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Play Dual Role, Compcon Told

(Continued from Page 1)

signed to give consideration to the effects on the public, he said.

But involvement might also be motivated by the desire to preserve or implement voluntary systems.

"It is clear that laws can have horrendous consequences" for DP, Ware observed. Legislation often ends up miles away from its original intent and proves difficult to implement, he said.

Private Sector Law 'Inevitable'

The momentum for privacy legislation is clearly mounting and will probably result in a federal law affecting private business within two or three years, Ware said.

"I think it's inevitable," although the abuse of personal information in private industry is not nearly as evident as it is within government, he pointed out.

Already this year there are no less than 37 state bills on some aspect of privacy, he said, most of them involving DP. Ware painted the specter of corporations attempting to deal with 50 different state laws on the use of personal information.

"There would be a continuous series of retrofits; software stability would become a thing of the past," he said.

But his audience's amused reaction indicated software stability may not be here yet.

An individual must have some control over the use of his information and there must be some legal basis governing the use by others of certain personal information, Ware contended.

If there are no controls, each individual will be at the mercy of organizations that regard the information as their property, he cautioned.

UK IBM Users Protest Price Hikes

(Continued from Page 1)

response, which is all we expected," Hooper added.

IBM Standing Firm

Meanwhile, IBM is standing firm behind its price increases. "We would stress that we consider the increases which have been announced as justified, reflecting as they do the severe cost inflation the company has been facing for some time," an IBM spokesman said in response to the user association's complaint to the I-FC.

"We've made our statement and plan no further action once the 20% increase is put into effect," Hooper said, adding that the association "is not looking for a but a collection of a public shaming match with IBM."

If stressed, however, that member users believe this pricing policy should be closely examined as part of the overall

Telex Files for Rehearing

TULSA, Okla. — Telex Corp. has filed a petition for a rehearing of its antitrust suit against IBM with the U.S. Court of Appeals for the 10th Circuit in Denver.

Arguing that the court of appeals erred in defining the relevant product market, the petition asked a review of the case by the full court.

The appeals court judgment, reversing a trial court finding that IBM had violated the Sherman Antitrust Act, was handed down by a three-judge panel on Jan. 24 [CW, Feb. 5].

In addition to a faulty product market definition, the Telex petition maintained the appellate opinion contained "substantial errors resulting in a gross miscarriage of justice."

The company said its petition stated

one major error was the court's holding that IBM marketing strategies, price cuts and price manipulations were proper competitive responses.

"Telex also said its petition contained 'detailed explanations of the error of fact, misapplications of applicable law and inconsistencies in the decision.'"

The company said it was "hoping" that a full court hearing would be granted by the appeals court and that the decision would be overturned after hearing. If added, however, that if unsuccessful in either obtaining a rehearing or overturning the three-judge decision, it would request a review by the U.S. Supreme Court.

"We remain convinced that the company's legal position is correct," Telex asserted, "and that we shall ultimately prevail."

FPC Confirms Contract Officer

Worked for Bid Winner's Firm

WASHINGTON, D.C. — A Federal Power Commission (FPC) official has confirmed that one of its contract officers who helped put together requirements for a \$10 million computer contract between that agency and Planning Research Corp. (PRC) was employed by PRC for six years prior to accepting the FPC job.

George Brent Vivian, who also helped draft some of the technical contract specifications for a facilities management contract that could yield PRC up to \$10.4 million, was employed by PRC from 1965 to 1971.

Vivian's name appears as contract officer on two consecutive requests for procurement which resulted in contracts awarded to PRC. The first was in 1973 and the second in June of 1974.

The 1974 contract, which called for a fully automated, on-line regulatory information system to be managed on a facilities management basis at the FPC headquarters, is still under investigation by the General Accounting Office at the request of Rep. John E. Moss (D-Calif.) [CW, Dec. 11].

In initiating the study, Moss questioned the propriety of permitting PRC to manage sensitive regulatory information such as availability of natural gas, locations of closed-in wells and applications for rate hikes, for example, since PRC's subsidiary, Foster Associates, represents petroleum interests in Washington.

Joseph DiMarino, assistant executive director of the FPC, confirmed Vivian had been employed by PRC, but said Vivian removed himself from the program when it became apparent PRC would bid on the facilities management contract.

With Rep. Moss' accession to the chairmanship of the Investigations and Foreign Commerce Committee, some observers feel there is a possibility Moss might use that committee's jurisdiction to hold hearings on this contract and other FPC matters.

The subcommittee, acknowledged to be one of the most powerful investigative bodies in Congress, possesses legislative oversight authority over the entire federal regulatory agency structure, including the FPC.

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Approach to Program Design More Vital Than Tools

By Molly Upton
Of the CW Staff

SAN FRANCISCO—If you can't describe clearly how a program is going to be designed, don't reach for coding sheets for the answers!

That was the basic message of several speakers at Compcon '75/Spring, the IEEE Computer Society's international conference held here last week.

Both the software keynote address and a session entitled "Obtaining Reliable Software" emphasized the methodology approach, rather than assessment of programming tools.

Keynoter William McKeeman, chairman of the information sciences department at the University of Santa Cruz, stressed the need for using a natural language when outlining construction of a program.

In his address, "Preventing Programming Languages From Interfering With Programming," McKeeman urged programmers to use a multistep, multilanguage process and, above all, to document each stage.

Ralph E. Keirstead of the Stanford Research Institute agreed. In his presentation on software correctness during the technical session, he said one cannot expect one language or group of languages to cover the spectrum of tasks to be performed.

While both men implored programmers to use a language they can easily think in, such as English, to clearly outline the way a program will be constructed, Keirstead extended the range of languages to include an expanded program language.

Too much of the clerical work that should be done by compilers, is being done by programmers, he said.

McKeeman sketched various stages in

program creation, stressing orderly transitions.

Only after outlining the method of solution in an understandable language should the programmer embark on implementing the approach in a programming language, he said.

Documentation should be made at each stage so the logic behind further program refinements, such as combining loops, will be evident to those who later have to cope with the program, he said.

"We need cleverness, but make it understandable," he pleaded. "The whole program presentation should be readable, but there is no substitute for formal methodology when dealing with formal systems," McKeeman said.

Keirstead emphasized the need for avoiding the quantum jump created when one throws away intermediate programming efforts. He asked for a review during the process, which requires documentation.

"Postimplementation analysis is too

late," he warned. "It should come earlier."

Review will minimize the antagonism between overall performance and well-defined specifications, he said. In fact, both of these elements tend to "creep along together," thus blurring the antagonism that can occur between them.

CW At Compcon

And "the big battle at the end gets replaced by a number of skirmishes." It's better to lose a little along the way than to lose it all at the end, he observed.

Keirstead explained that in order to relieve programmers of tasks that could be left to compilers, both the notions of what constitutes a declaration and the sense of what "executable" means should

be expanded.

The concept of measures of efficiency have been narrow, McKeeman said. Programmers currently tend to focus on execution time, but how about considering the whole process when people are involved?

Ed Miller of General Research, Inc. gave some dos and don'ts on writing testable code. General Research is involved in creating packages to analyze and test Fortran programs for reliability.

In his plea for what amounted to structured programs, his advice was to write clearly after thinking clearly. "Structured programming is really not a pile of crap, although it may sound that way if you listen to too many of the wrong people," he said.

Miller's don'ts, or impediments to testability, included "long reach sequences, internal structure complexity, internal semantic opacity and block communication."

Controversy Dying

By CW Staff Writer

SAN FRANCISCO—The concept of programming regulations—or standards—seems to have lost much of the controversial status it had two years ago if the reactions of a large audience at the 10th IEEE Computer Society's international conference, Compcon '75/Spring, session on "Obtaining Reliable Software" are any indication.

Although the concept, endorsed by panelist Larry Weaver of the Institute of Advanced Computation, generated much active discussion, there seemed to be a growing, if tacit, acceptance of the necessity for standards.

Two years ago, said Weaver, the idea of programming regulations would have elicited nervous reaction, much of it centering on a widely felt need to let a programmer be creative rather than subject him to regulations.

Comparing programming with the effort involved in putting up a building, he asked, "Why are we so remote from achieving the same ease of construction?"

Carefully codified sets of standards and due process for changing code could do much to help avoid many pitfalls, he said.

Throughout construction of a building, he said, the implementation of plans are inspected, and the plan itself has to pass review.

Advantages of what he termed the "building code" approach are numerous, he said.

Inspection at each stage of completion prevents programs from wandering off in wrong directions.

Reuse of checked-out modules is encouraged, since they are better identified and documented and known to conform to code.

Training and evaluation of programmers, contract writing and cost estimation are placed on a more understandable and less individually biased basis, Weaver said.

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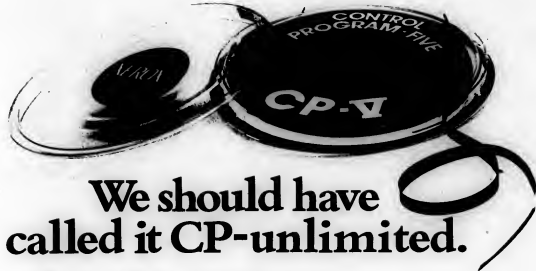
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NCR packed a lot of equipment into its booth, including its NCR 260 terminals and Quantor-supplied COM recorder.



It isn't a slot machine, but winners at the Control Data booth walked off with binoculars if they hit the right combination of slides.



Hewlett-Packard lined up its 2640 terminals and 21MX minicomputers.



Software AG made good use of a video tape recording to demonstrate how its Adaptable Data Base System (Adabas) functions.

Caravan Told Privacy Costly

(Continued from Page 1)

sonal data inherent in the legislation." But the privacy safeguards could offset this savings through "reduced efficiencies" in computer use, O'Neal added.

Although the federal law is written for agencies of the U.S. Government, it also affects federal contractors and states using grants of federal money, he said.

Beyond cost requirements, the prohibition on use of the Social Security number (SSN) as a universal identifier "will perhaps cause some consternation" to future systems designers, he predicted. It remains unclear whether user agencies will be able to apply for the right to use the SSN, he said. "If not, we must design our own standard identifiers."

Users will also have to install a sizable program to maintain a record of who accessed regulated files and when, he noted.

DP: A Viable Management Resource

Despite these challenges, DP will continue to be a viable management resource in the future, O'Neal said.

Corporate management should therefore make sure its DP operations are cost-effective and should never view the function "just as overhead," he stated.

State government simply could not operate efficiently without computers, he



Ernie O'Neal

said. The state of Georgia processes some 1.5 million tax returns and is currently doing them with a two-week turnaround time, O'Neal pointed out.

Computer systems are also the only effective way to deliver much information to police officers, he said, adding social services also heavily depend on DP today.

Time for Expanded Commitment

This might even be the time for an expanded commitment to DP, since rising labor and other costs may have made it a more cost-effective approach to tasks and problems.

O'Neal urged attendees to be a part of their company's management team. "Get to know the kinds of problems and pressures management across the company deals with," he said.

DP "is simply a tool or mechanism you can use to make management's job a lot easier," he said.

The 'Tried and True' Dominate Exhibits

ATLANTA — Tried-and-true products predominated at the opening of the Computer Caravan here last week, with exhibits slanted heavily toward minicomputer, terminal/communications and software users.

While there were few introductions of new products, many exhibitors who showed products introduced over the past few years manifested a sophistication which enhanced the more varied demonstrations of main-line products.

One vendor with a new product in its pocket was Varian Data, which introduced its T-Scan 880, an RS-232C-interfaced card reader. The 880 reads a pencil-marked card and prints the marked data on the card while inputting the data to a computer.

The card is also print-coded during printing and can be reused. The second time it is used, however,

Photo Feature by Vic Farmer

the coded card is optically read so the information can be checked against the data base; the CPU, through the 880, can then print more data on the card.

Read/print rate is about 5 seconds and the unit is priced at \$7,500 from the firm at 12062 Valley View St., Garden Grove, Calif. 92645.

Cooke Engineering packaged a special 16-channel fallback switch at \$2,100 for the duration of the show. The device allows a user to switch modems, terminals and ports to spares at the push of a button. The firm is located at 900 Slaters Lane, Alexandria, Va. 22314.

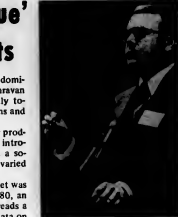
Modular Computer Systems (Modcomp)

demonstrated its Max IV software using virtual memory on its Modcomp IV mini-computer. General Automation showed its Data Management 100 system using the SPC 16/65 for the first time.

Other new products shown included Delta Data's 4000 terminal and the Sycon 340 with a floppy disk option.

Incomform was showing its Incomform Forms Generation Package but indicated they were not ready to release the product generally yet.

Hewlett-Packard had its 4K-chip, 21 MX minis on hand as well as their 2640A terminals.



Computerworld Publisher Patrick J. McGovern kicks off the fourth annual CV Caravan.



Varian demonstrates its 880 card terminal.

demonstrated its Max IV software using virtual memory on its Modcomp IV mini-computer. General Automation showed its Data Management 100 system using the SPC 16/65 for the first time.

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Real Measure of DP Performance Lies in How Center Serves Users

ATLANTA — "Bits and bytes" are important in measuring the performance of a computer center, but DP managers should remember their primary function is to supply service to users within their corporation, panelists at a Computer Caravan session agreed here last week.

The real measure of the performance of a center is how well it serves the users of computer power, George Martin of Dynalys of America, Inc. and Dan Gladney of The Southern Co. said.

DP managers often do not take the time needed to perform the measurement function, Martin said, adding that they should, because other managers are "not always qualified" to judge performance in DP.

'Preventive Maintenance'

At the same time, performance measurement should be thought of as "preventive maintenance," Martin noted. It should be used in every phase of a system's life cycle and not just brought in when there is a problem.

To be successful, the performance measurement function needs to be centrally located and to communicate with management, applications programmers, systems personnel, vendors and the end user, Gladney commented.

The communications with the users of the system can be the most important element, he indicated, because they will be the first to notice a real degradation in system response time and availability.

Formal feedback from the users to this centralized coordinating committee is one of the best ways to monitor systems, he added. After that, monitors — both hardware and software — can be used to track down the specifics of the problem.

This central coordinating committee, he said, should receive information on every error condition in the system, from the CPU down to a minor line problem in the communications system. The committee's function should be to isolate those problems and get the proper people involved in their solution.

At the same time, the coordinating group can keep top management informed of any system problems and, therefore, the need for new facilities or equipment, he added.

Running Before the System

The coordinating group should be established and up and running before the implementation of any system, Martin indicated, and should be used to help define exactly what is meant by performance within the company.

In his firm, as an example, the company uses response time as the key to measuring the performance of a system, since its users are interacting with the public when they need the system.

However, he indicated other companies might have different problems that would lead them to choose other performance criteria for their systems.

Railway Jilts IBM for Independent DBMS

(Continued from Page 1)

remote Linvax DCT 1000 terminals and IBM 3270s at headquarters for its own inquiries into the system, he added.

Data entry is done at the central site through 101 Burroughs TC 500 terminals. The source documents are the waybills the railroad's agents fill out for customers. Agents transmit facsimiles of the waybills to Atlanta, both for the car movement system and for accounting systems.

Much of the railroad's volume is from customers who repeat the same type of shipments. In these cases, the data entry operators can just key in a repetitive waybill code plus the variable information, Linn said.

An IBM 360/50 acts as a front-end processor, logs the data onto tape and queues it on a direct-access device for an IBM 360/65 processor.

Small Center Heads

Can't Ignore Planning

ATLANTA Managers in a small DP center have a tendency to sit back and say, "We'll take care of today's work today, and next month's and next year's work will take care of itself," according to John Austin, DP manager at Cotton States Insurance Co.

But planning is as crucial for the small center manager as for anyone else, Austin told Computer Caravan attendees here last week.

For one thing, the small center manager has to deal with a personnel situation in which each member of his staff has to wear several hats, he said. But he must remember the shop's excellent operator may make a poor programmer, since the two jobs suit different types of people.

It's also up to the DP manager to use some initiative and imagination to cut costs, Austin said. Cotton States' DP department, for example, has tried to redesign its forms so "they work for us rather than us working for them."

Another question is how to produce management reports for a number of different people in the company when the DP department's computer is relatively slow.

One solution is to run one report instead of six or seven if people in the company are seeking essentially similar information, he said.

Southern's original software for this system included a single-thread scheduler and a file handler which no two programs could reference on a reentrant basis. This software initially served quite well, but

system... and found we could gain 25% to 30% in throughput," Linn said. DBMS users usually expect to lose some throughput for greater flexibility, he noted.

CW at Caravan

eventually became a bottleneck, Linn said.

The scheduler, for example, had to be revised as the shop added application systems. Approximately 30% to 50% of the application code was concerned with DBMS functions, Linn noted.

Three years ago, Southern began looking at a generalized DBMS as a solution.

IMS provided both the data communications and data base facilities the applications required.

"We benchmarked IMS against our single-thread file handler and scheduler

The shop decided to implement IMS as a scheduler first. This phase was completed a year ago after an eight-month conversion process.

At this point, the Southern DP shop rewrote its file handler so it could be invoked by any number of tasks, Linn said. Throughput jumped 50%, he said.

IMS, the staff decided, would be too complex for them to rely upon to handle a critical application like the car movement waybiling system. The railway then selected Cullinane Corp.'s IDMS for a three-month trial.



CW Photo by V. Farmer

Dr. William E. Linn told Caravan attendees Southern Railway's programmers agreed Cullinane's IDMS would be easier to use than IBM's IMS.

The shop also looked at MRT's System 2000, but that DBMS seemed oriented to retrieving data rather than updating, which was the opposite of Southern's needs, Linn said.

Total from Cincom Systems appeared to be a simpler system and would have been the shop's second choice after IDMS, he said.



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Boston DP Center Helps Track Down Missing Students

By Edith Holmes
of the CW staff

BOSTON — The Boston School Department's DP center has helped cut the number of missing or chronically absent students from 3,000 to 1,000 over the last 2-1/2 months.

Discrepancies between the projected and the actual enrollments in Boston public schools have plagued those who must plan for the district ever since classes began last September, James Daley, School Department DP chief, said.

"We expected to have about 91,000 students," he noted, "but, by the end of November, monthly attendance figures sent to the superintendent's office by the principals accounted for only 88,000."

"Certainly, the racial upheaval associated with busing has contributed to the high rate of missing and absent students this year," William Harrison, assistant superintendent of schools, commented. The School Department is rarely in-

formed when parent and student resistance to busing keeps pupils home or sends them to parochial, private, other public schools or, sometimes, illegal educational efforts outside the Boston system, he noted.

High Absenteeism

The result has been a high rate of absenteeism, even among those students who are regular attenders, he said.

"For the last few weeks, attendance has averaged from 66% to 73% of the 88,000 who have actually reported for school."

The School Department turned to the DP center for help last November, when a drive launched in October to have every chronically absent or missing student identified on an attendance card submitted by teachers proved unsuccessful, Daley said.

"The DP center agreed to help, with the understanding all we could do would be to bring the projected and actual enrollment figures closer together by flagging

those students who haven't been seen much," he added.

Using attendance records, report cards and homeroom assignments as criteria for identifying students with attendance problems, Daley said two runs were made on the center's IBM 370/125.

The first program produced an alphabetical list by school of all pupils in all grades with each student's name, homeroom number, sex, curriculum, date of birth, year of graduation, address and telephone number.

Only an Estimate

Students without homeroom numbers were designated "no-shows," those who never showed up for school, Daley explained. But this list provides only an estimate of the total number of missing students, he added.

Some principals might have assigned homeroom numbers before the students arrived for the opening of school, and the possibility exists that some pupils may be

listed at more than one school.

The second program depended on grade reports to determine those students who are chronically absent, and students who have been chronically absent is likely to show either no grades or failing grades, in addition to a poor attendance record.

Ongoing Search

The search for missing and chronically absent students is ongoing and involves the efforts of the DP center and the DP departments located at each school, he noted. Using the methods developed over the last two months, "we have been able to identify kids who weren't reporting steadily," Daley added.

But once identified as missing or as poor attenders, students must say they're not coming back to school before they can be dropped from the projected enrollment.

"Unless a child says he isn't going to be in school, that seat is legally his, and the school system must plan for him regardless of whether he is there," Daley said.

He added that the number of students who ask to be taken out of the data base is very small, resulting in projected and actual enrollment figures that are still off by 1,000.

'Computer Error' Law Gets Nod in Maryland

ANNAPOLIS, Md. — A new consumer law designed to help cope with problems arising from errors on computer-generated bills has been passed in Maryland.

Covering any company that does business in this state, the law specifies procedures to be followed by the consumer and the company in correcting the error or explaining why the bill actually is correct, according to Jane Howard, spokeswoman for the Prince Georges County Consumer Protection Commission.

The consumer has 60 days from the date he receives the bill to write to the company, identify himself by name and account number and state what he believes to be wrong with the bill, according to Howard.

The company must acknowledge receipt of the letter in writing within 30 days.

Within 60 days after receiving the letter, the company must notify the customer that the error has been corrected or explain why the bill was correct as originally sent, Howard explained.

"During the 60 days that may elapse between receipt of the consumer's letter and resolving the claim, the billing company may not attempt to collect the amount in dispute," Howard explained, "nor can they give an unfavorable credit report to any credit bureau or credit reporting agency based on your failure to pay the amount in question."

However, the company is permitted to bill the individual as usual during this period, she said.

"The company may not assess the service charge on the questioned amount, whether it is a mistake or not, from the time the individual mails his inquiry until the date the company informs the customer in writing whether the bill is correct," she explained.

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Letters to the Editor

Don't Shift Blame

After reading J.L. Down's letter about increased paper costs [CW, Jan. 29], I am amazed to see the standard scapegoat of inflation being used in our profession.

A recent major TV network news program attempted to pinpoint the "cause of inflation" in our profession. While interviewing managers in every phase of a product's manufacture and distribution, from processing raw materials to final sale to end consumer (and covering several diversified products), it was consistently told, "Our costs are up, but profits are down."

We all know that money is being spent at fantastic rates, but if everyone is showing losses or just breaking even, where is the money going?

Certainly, papermills are not totally responsible for the increased costs of paper, but they must be part of it and should admit that fact.

To paraphrase Downs, crooks they are not — possibly; realistic they definitely are not.

J.W. Noyes

Dallas, Texas

Grosch Not Obscene

After reading Robert C. Fish's letter [CW, Feb. 12], I rushed to my trusty *Random House Dictionary of the English Language* to see if Herb Grosch really had exposed me to another of his

examples of obscenity or graffiti in his Jan. 22 column.

Since *Computerworld* is not a public sidewalk, wall of a building, wall of a public restroom or the like, I was pretty sure I had not been exposed to another of Grosch's examples of graffiti. That turned out to be the case. Had I been exposed to another example of Grosch's obscenity?

Well, if I only knew a meaning of "crappy," perhaps I had. However, "crap," in the context it was employed, brings to mind lies, exaggeration, rubbish and a mess. I wonder if Fish is offended when he sees the word "crap" printed in a newspaper?

Incidentally, I've always thought Grosch was much too pro-IBM, and I'd appreciate your censoring any pro-IBM statements in your newspaper; I find them obscene.

Fred Littrell

Raleigh, N.C.

Leave Arena to Caesar

In reference to Ken Lord's challenge to the Association for Computing Machinery (ACM) [CW, Feb. 5], Lord used invalid premises and no conclusions in castigating ACM.

ACM should leave to Caesar the political arena, the members recognize Lord's society is not technically oriented and are therefore in a better position to view the forest with alarm.

Fred Sanson

Boulder, Colo.

The Security Game

Readers may remember that three or four years ago IBM, in the person of Vir Leamon, made a public commitment to data security. Since then the four major projects set up and funded by the company have published their reports — I wrote an innocuous foreword to one volume of the Illinois results. It was quite useful for IBM or its competitors to build a great deal more hardware and software security into future systems: into FS, in fact.

Let's speculate how the ads might read. "We believe that during the life of this powerful new family, every customer will have some need for data and system security. Accordingly, all accesses are guarded by hardware and software locks and passwords. All terminals and other peripherals are connected to internal channels via sophisticated scramblers. Data communications are heavily encrypted."

"Valuable and sensitive data will be available only to authorized electronic and human destinations."

"Because this security equipment has been designed into FS from the outset, it reduces throughput and capacity only very slightly. Because it is part of every level of equipment, and not added in only a few places or for select customers, its cost is spread over the entire installed base and is correspondingly low."

And so on — it's not hard to write copy for such a capability. But now look at the new "secure" IBM machines. Each box is scheduled and physically locked up. All password checks and encryption and decryption are done inside, where the plug-to-plug boys can no longer go. Inter-

faces are not only coded, but run through the middles of several minuscule multi-layer chips. No crude hackaw, no handy-dandy Canon plug can intrude.

Physically, a printer or a terminal or a box of add-on memory can be unplugged and a compatible non-IBM substitute connected. But what it gets from the central system will be gibberish — and, needless to say, gibberish that changes at frequent and unpredictable intervals. All the IBM peripherals understand it, stay in step. But the cheap competitive gear is out of touch, substantially deaf and dumb and blind, until somebody works out the new code.

And remember, it could be time-dependent. Imagine cracking a safe where the combination was 32 or 64 bits long and changed every few minutes under control of a clock inside the safe!

Yes, there is a real possibility that hardware and software and data will be much more secure in the post-1976 FS era. There is virtual (oh, oh, that word!) certainty that IBM will be more secure. That was \$40 million well spent, boys!



Heiser Tests Modified to Suit Other Environments

The Heiser tests published in the Taylor Report [CW, Jan. 29] were developed in the context of testing a record-updating routine when the file was held on magnetic tape and the programs were written in Cobol.

The 15 specific tests listed (such as "If items are added or deleted, do record counts record properly?") included ones made necessary by that environment and excluded ones not involved in checking the accurate working of the Cobol updating routine, although such tests would have been needed to check out an operational program incorporating the routine.

After the article was published, Paul Desjardin, a long-time leader in DP, reorganized these tests into different categories. His standpoint was as different from Heiser's as chalk from cheese.

He was not considering the same language or the same type of data base. I don't really think he was considering even the same type of program (Heiser's is a routine for incorporation into other people's program — but that makes his results more valuable).

The comparison of the Desjardin and Heiser environments is as follows:

	Desjardin	Heiser
Machina Type	Microdata Reality	IBM 360/370-Type
Language	Basic in Proprietary Form	Cobol in Standard Form
Type	Direct Access Data Base	Sequential Type Data Base

In the Desjardin breakdown of the tests, the categories were those that fitted the Desjardin environment. These were tests like "Does the recovery from a missing master record get reported properly?"

A second was a group of tests which, while sensible to the Heiser environment, were not needed in directly accessed data bases. Two other groups he rejected, at least until further clarification of "record counts" and "sequence" are available or until association is made to the specific field type in the data base. The Heiser tests, reorganized into the Desjardin categories, are shown in the box at the right. If there is any fit at all — and there is — the tests certainly allow the development of a more embracing series of general-purpose tests, together with some idea on how to apply them to specific circumstances.

In itself, these comments show, as I suspected, there is the germ of testing methodology in the Heiser tests — at least for file-updating routines.

Desjardin's Additions

However, Desjardin was not content with merely reviewing the Heiser tests. Looking at the problem from a user's point of view instead of simply from the view of a programmer wanting to use a pretested routine, Desjardin pointed out one essential area is missing.

He argues data field editing and auditing is essential to the maintenance of a data base and should be included. And, from his point of view, he is perfectly correct.

As he points out, a field that is supposed to contain a Social Security number should be able to be tested to show it is made up of three numerics, a dash, two more numerics, a second dash and four final numerics.

Put briefly, this, in Desjardin's system, is checked using the form "SOC.SEC =

(3N2N-4N)."

So, there is another item that is checkable and for which checking has been worked out. There does not seem to be any reason why this check should be incorporated into a general checking system.

Not Alone

Desjardin is not alone in having tests over and above the Heiser ones listed. Alexander O'Reilly of Centaur Management Consultants in New York told me the firm has a checklist more comprehensive than the one shown.

He, like Desjardin, adds a dimension that must be considered, that of the application. Centaur has been specializing

in system testing in the financial management area. This brings up the prospect that industry considerations should also be taken into account.

All in all, it looks as though there is more known about testing than their lack of publication would indicate.

If you have any testing checklists, methodologies, etc., or just comments on the Desjardin, Heiser or O'Reilly commentary, I'd like to hear about them so they can be passed on to other readers.

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DESJARDIN'S CATEGORIZATION OF THE HEISER TESTS

AREA ONE: Tests Applicable to Direct-Access as Well as Sequential-Access Data Bases

- Does recovery from a missing master record operate properly?
- Does the occurrence of a missing master record get properly reported?
- Does the recovery from an attempt to add a new master record where one already exists operate properly?
- Does the occurrence of such an event (e.g., adding a new master where one already exists) get reported properly?

AREA TWO: Tests Not Applicable to Direct-Access Data Bases

- Can records be added before file-start?
- Can records be added after file-end?

AREA THREE: Tests Which Need Concept Clarification Before Acceptance

- If items are changed, do record counts record properly?
- If items are added or deleted, do record counts record properly?
- Does the recovery from sequence error operate properly?
- Does the occurrence of sequence error get reported properly?

AREA FOUR: Tests Which are Superfluous

- Is the current data changed by the change process?
- Can records be added?

AREA FIVE: Tests Which Need Data Base Definition Before Being Used

- If items are changed more than once, is the last change recorded properly?
- If an item is added and then changed, do both functions record properly?
- If an item is deleted after a change and an addition, does the security record properly?

Letters: Readers Keep Licensing Debate Open

SCDP Willing to be Flexible

But Will Pursue Its Course

Our many thanks for the editorial, "No Guarantee" [CW, Feb. 12]. While we may not agree with everything in it, we do appreciate the fact that *Computerworld* has begun to treat licensing as the serious question it really is.

We claim very specifically not to have all the answers and we do not, nor have we felt since we began this action, that the bill is in and of itself an absolute, or that the bill is an absolute solution to the ills we seek to correct.

We are more than willing for the bill to be treated by a legislature as a flexible instrument, to be modified as necessary and made workable.

Yes, we can agree that people will be people and there can be no means whatsoever to legislate morality. But CW's editorial omitted one very critical point: That there are unethical doctors and lawyers, or even certified public accountants (CPAs) we do not dispute. But each of those professions, even in retrospect, has the ability to dishonor such a practitioner, to legally prevent him from practicing, to keep him from further harming those whom he serves.

Our concern is simply this: There is no profession where there is not also the ability to preclude someone from the practice of that profession. We do not enjoy this in the DP field today; we merely shift our incompetents from organization to organization.

What we seek is not to license all DPs, but rather to create an entirely new classification called the "licensed data processing professional." Yes, the requirements should be stiff. Yes, the credential should be difficult to obtain, even to the point where some already confident practitioners, holders of the Certificate in Data Processing (CDP) included, would have to hit the books to obtain it.

We recognize this is not the burning issue for legislatures, at least until some legislators begin to see the ramifications and ties to other aspects, such as privacy. But it is very much a part of the same issue which, if boiled down, could be stated as follows: There simply is no commonly accepted practice for data processing.

We're willing to be flexible on the issue. We would welcome the other industry groups taking a hand in making such legislation work. If the industry, as a whole, were to undertake an organized, funded and committed activity to establish a commonly accepted practice for DP, then we would consider modifying our stand, or delaying it until that practice is defined.

So, you see, Mr. Editor, it's not a game and it's not politics. It's an issue about which much serious consideration was given, much preparatory spadework was done, and much debate within our group was conducted. It's an issue which we'll continue so long as our resources permit. But it's not a "tempest in a teapot." The concept is workable, if given a chance. It will be the efforts to block it that will "hold back innovative solutions."

Kenniston W. Lord, Jr.
President

Society of Certified Data Processors
Hudson, Mass.

Another Reason

I very much agree with your editorial doubting the efficiency of licensing for preventing computer abuse. I would like to add one more reason to yours.

Unlike doctors, lawyers and certified public accountants (CPAs), computer people are not usually independent of the firm for which they are doing work; they are employees. They are not free to say what they, as professionals, will do or not do.

How is this certified professionalism to be implemented, since few DPs can say of a project that it is abusive and must be modified or they won't have any part of it?

Professional DPs can warn, persuade and educate non-DP managers, but they cannot usurp their authority and should not be their scapegoats.

Susan H. Lewis
Waltham, Mass.

Self-Education Enough

In the last analysis, each DP is dependent for his paychecks on his job and his company. It is a thought that, if we all worked harder at our jobs, we would be more professional.

If you want young, qualified DP people, help your company grow and DP will also grow. Through self-education and re-education to the concept that DP is part of a team that makes your company the winner it is, you can find the self-regulation that only knowledge can produce.

Streamwood, Ill.

R.E. Sennet

History Teaches Otherwise

As chairman of the American Federation of Information Processing Societies' (AFIPS) Professional Standards and Practices Committee, I couldn't let you get away with your Feb. 12 editorial.

You concluded that, because there are a few baddies around in law, medicine and auditing, licensing in those professions is ineffectual.

A brief look at the history of professions in the 19th Century shows the disastrous effects of unlicensed professions and the beneficial effects of licensing that have generally made these professions play responsible roles in society. Where is the proof that "licensing will have little effect on unethical behavior?"

A fundamental of professionalism is to serve companies and institutions, as well

as society at large, more effectively. Probably through public outrage, legislation will force the responsibility on DP occupations through licensing.

Personally, I would like to see an orderly progression of licensing when DP has reached the maturity to make it workable. The Institute for Certification of Computer Professionals (ICCP) will play a major role in getting us there someday.

Donn B. Parker

Menlo Park, Calif.

Point to the Source

All the talk about professionalism in the computer industry is fine, but we need to face up to the reality that a lot of what we have to deal with starts not with computer programs written by users, but with systems programs written by programmers employed by the computer manufacturers.

(Continued on Page 11)

GREAT COMPUTER SECRETS



GCS 2100

entry system.

(Continued from Page 10)

Too often we are flooded with partially or, worse, misdocumented software that uses nonstandard symbols and confusing mnemonics.

If we are going to point a finger, let's point to the source of a lot of our problems.

Ernest Stiltner

Boulder, Colo.

Too Much Lip Service

I wish to add my support to the Feb. 12 editorial. The myth of "DP professionalism" can and has done incalculable harm.

The ideal of DP as a service organization which is highly user-oriented is given a great deal of lip service. But the sincerity of the dedication to this ideal becomes suspect when DP people blather endlessly about being "DP professionals," thus giving the impression that it is DP per se which is important—not DP for a specific task but DP just to be processing data.

Is it any wonder that barriers of suspicion exist between users and DP groups?

Communications between users and DP people is the greatest single problem in DP and the failure of DP people to identify with users is a major cause of that problem. The increasing "incalculability" certain to occur with the encouragement of professionalism by formal licensing will tend to compound the problems of identification and communication.

Licensing will increase the problems of communication by creating a provincial, protected, "professional" status for favored DP people.

Kansas City, Mo.

Terry E. Davis

CDP Means Nothing

Many people who hold a CDP are very competent in their positions and execute their responsibilities with effectiveness. On the other hand, several CDPers almost closed down the installation where I work because of personal goals and un-awareness of our company's needs.

Thanks to a few executives of our company, DP was given a chance to dig itself out of the hole it was in. No thanks to

any piece of paper hanging on the wall! R.W. Bryant
Colorado Springs, Colo.

CPAs a Poor Example

The Feb. 12 editorial noted CPAs have not generally discovered illegal political contributions made by companies whose statements they were examining. This is cited as evidence that a state license does not prevent its holder from having failings, but it is unclear from the context whether the evidence is supposed to demonstrate immorality, incompetence or glibness. While I agree with the original proposition, the example was inappropriate.

To give a CPA certifies financial statements is to say that, in his opinion, they are fairly presented. Among other things, fairness implies the lack of "materially" incorrect representations on a financial statement. Rough synonyms for "material" in an auditing sense are "important" and "financially meaningful."

For a large company, it is always impractical and usually impossible for a CPA to reconstruct every financial trans-

action that has taken place during the year being reported on. He must and should confine his most searching examination to material items.

As a management services consultant, I am naturally interested in the licensing controversy, but as a CPA I am at least equally concerned with the public image of that profession.

William H. Handman
Southfield, Mich.

Protection by Bureaucracy

I have seen no evidence which indicates the licensing of professionals in any area has any beneficial effect on society.

In my opinion, those who are attempting to force the licensing of DPs wish to create a bureaucracy in which they can yield power over the lowly professionals they are pretending to protect.

These licensing advocates will devote most of their lives to this attempt because they visualize great monetary rewards if they are successful.

They are most likely to be successful through the legislative route because they will be dealing primarily with lawyers who have established a similarly unnecessary bureaucracy.

I hope that the licensing promoters will be unsuccessful but, from past observations, I know that they will be successful sooner or later.

Herbert A. Morris

Pooria, Ill.

Ability the Key

It seems to me that if the so-called professionals who are pushing the licensing legislation would put as much time and energy into developing better systems for their companies to save money, perhaps they would be recognized for their abilities without having a license stating, "Hey baby, I'm a professional."

The day I implement a system which doesn't work or bring it in significantly over budget, I will probably be thrown out on my ear. The possession or lack of a license is not going to change that.

Thomas L. Palmer

Elkhart, Ind.

Educational Biotry

We now find members of our own profession implying that many of us are crooks and incompetents. Ken Lord and his associates fed legislation is required to eliminate the undesirable, the undesirable being those without higher education and not certified.

It is amazing that four years of higher education equals years of on-the-job experience. It is also amazing that being certified makes one an immediate professional.

Lord should, if possible, remove his head from the obvious place it now resides. Educational bigotry has no place in this profession.

Certification must be viewed as an individual preference. It should not be dictated by those who view it as a means of financial reward or as a status symbol.

James E. Harper
Palatka, Fla.

Certified Systems Necessary

I believe there is a need for licensed DPs. Not every organization needs one, but any programs seriously affecting either the well-being of individuals or the community should be certified by someone willing to go to jail if the product is not as certified.

I note that much opposition to licensing comes from managers. Establishing independent standards certainly cuts into their prerogatives to set criteria, which affects the bottom sheet of a profit-and-loss statement rather than any common good.

Major hardware vendors also would be challenged if DP standards were taken from their hands.

Hugh Cort

Birmingham, Ala.

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The GCS 2100 provides extensive I/O functions that allow you to transfer data to and from disc storage and other I/O devices, and provides an audio trail (comprehensive statistical reports and monitoring the system and the operator's performance), all with minimum impact on a supervisor's time.

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Overpaid School Aide Sued for Extra Wages In Payment Mix-Up

HOLIDAYSBURG, Pa. — School district officials here claim a "lack of experience" with a payroll system resulted in the overpayment of \$1,259.76 to a teacher's aide and, in an effort to recover the money, the district has sued the aide on the grounds of "unjust enrichment."

Jennifer Homsey was hired by Intermediate Unit 8 (IUB) in October 1972. One year later she received a letter stating there was a mix-up, equaling \$530.92, in the amount paid her during the year.

Meanwhile, although Homsey was dismissed from the job in May 1973, the educational unit kept paying her until Aug. 24. She received a total of \$728.84.

Earl Bonnet of IUB said it's traditional to pay aides through the summer months, but when Homsey and three others were fired no one programmed the computer to stop payment.

Inexperience Blamed

The school unit recently converted to a computerized system with which it had no prior experience, and Bonnet claimed this was the reason for the error.

Some aides had contacted IUB as early as November 1972 inquiring if they were being overpaid, according to Homsey. They were told the office doesn't make mistakes, she said.

The other three aides have agreed to pay back the overpayment, but Homsey refused and is being sued for the amount overpaid her during the summer.

Threatened Suicide Averted by DP Center

CINCINNATI — An early morning phone call threatening suicide recently prompted city police and a University of Cincinnati (UC) official to call upon the resources of UC's computer center, hoping to prevent it in time.

Cincinnati police received a call from a pregnant young woman saying she was going to kill herself. She told them only her first name and the fact that her husband worked at UC.

While the woman was kept on the line, a series of phone calls ensued, beginning with a call to UC police.

Fed Wives' Names

Not having enough information, the campus police called James Eden, UC's vice-president of management and finance, who in turn phoned the director of the DP center, Robert Caster.

"Caster brought in a programmer who fed the first names of wives of employees who live in a certain district, combined with their zip codes, into the computer," Eden said.

Within a half hour, city police were given three names and address possibilities. One of three patrol cars dispatched arrived at the scene, and the suicide was averted.

AT LAST, A DOS/VS PARTITION BALANCER
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Random Notes

UCC Extends Tape Manager To Cover Multidata Sets

DALLAS—The capabilities of University Computing Co.'s (UCC) tape management system, UCC One, have been extended to cover multidata set volumes while the audit and exception data sets have been expanded and combined.

The audit data set is used to restore the tape management catalog (TMC), the key to the operation of UCC One, the company noted.

Password-level security has been added to the system. So has a capability to record temporary error statistics, while an on-line inquiry feature enables the operator to review and update the TMC.

UCC One uses approximately 1K of core plus 5VC transients and sells for \$10,000 from UCC at 7200 Stemmons Freeway, 75247.

Basic/Four Program Fits Distributor's Needs

CHESTNUT HILL, Mass.—Distributors can utilize the Basic/Four small business computer system to handle everything from order entry and invoicing through reports to regulatory agencies, if needed, with a highly modular software system developed by Human Integral Systems.

The system was put together specifically for liquor distributors by much of its logic can be used by distributors with other lines of trade. The software runs on the smallest Basic/Four and costs from \$30,000 to \$30,000 depending on the modules required, the vendor reported from 1238 Boylston St., 02167.

'Aptrec,' Written in Cobol, Eases Apartment Management

BIRMINGHAM, Ala.—Accounts receivable for large-scale multiple unit apartment complexes can be handled on a user's in-house system or through a service bureau with the Aptrec system now available from Information Services, Inc.

The system accepts any number of units, postal rents due and large charges and generates a variety of reports. The choice of reports wanted at any time is controlled by the operator at runtime, the vendor said.

The disk-based Aptrec is written in Cobol and runs in 35K. It can be acquired now for \$4,500, which includes on-site support, from the company at 3 Seventh St., West, 35208.

Oxford Wells 'Sprint,' 'Distat'

FORT LEE, N.J.—The Dynamic File Allocation System (Distat), developed by Tower Systems, Inc., and the Sprint packages, developed by Jason Data Systems, Inc., are now both being marketed to IBM DOS users by Oxford Software Corp., 511 Main St., 07024.

SOFTWARE & SERVICES

Package Cuts Run Times...

Proud Operations Staff Welcomes Aid

By Don Levitt

Or meow start

DURHAM, N.C.—Even when you have a lot of pride in the abilities of the staff you have assembled, there are times it makes sense to acquire and then use a packaged approach, according to Tom Worley, operations manager of the DP center at Blue Cross/Blue Shield of North Carolina.

Worley and his staff of 16 have their hands full with the care and feeding of a 1.5M-byte IBM 370/155 running under OS/MVT Release 21.7. He expects to move to a 2M-byte 370/165 "with a Dynamic Address Translation (DAT) box if we can find it"—to be ready for national health insurance, but the present configuration is running "very well."

Worley has a crew of operator and support personnel that has written its own tape library control system and has converted the center's program library from DOS to OS. The operators have also converted all but a dozen 1401 Autocoder programs to Cobol so they could run more effectively on the newer IBM gear.

But they use the OS Job Accounting Report System from Johnson Systems, Inc. to monitor and improve their overall operation.

The Johnson package pleased Worley right from the start. He wasn't in on the decision to get it, but was impressed with the ease of installation.

"The Johnson salesman came in with it," he said. "He linked it into our system and we've been running with it ever since."

"Running" seems a good word for the Blue Cross/Blue Shield DP center here. It

is heavily IMS-oriented with 22 remote and 105 local terminals, and it runs between 6,000 and 7,000 job/mo on a five-day week, three shifts a day operation.

It had only a quarter hour of downtime last month, and none the month before that, Worley noted with justifiable pride.

'Crunchers' Spotted

The job accounting/system utilization system from Johnson has several big advantages, he added. "You can see which programs are the big CPU crunchers. You can analyze them and find out why [they hog so much of the system resources]."

"Big payoffs, too. We've had one run that we cut from three hours to one hour, just by utilizing the Johnson System output."

In another situation, the IMS control program utilized 675K bytes of memory in prime time. Although the job accounting reports haven't been able to cut that dramatically, they have trimmed it somewhat and made sure that the space allo-

cated is really used.

The cost allocation capabilities of the package are just now coming into use at Blue Cross/Blue Shield. The DP staff has spent months working with the accounting department to develop accurate and acceptable chargeback schemes for the various user "customers."

The whole concept has been under development about a year, Worley said, but the reports for the users have been available for just the past three months. Actual chargebacks are not being made yet, he added, but even so, users are apparently becoming more conscious of the computer resources they are using—or aware that additional requests will ultimately result in additional charges.

The flexibility and power of the Johnson System package reminded Worley of a home-grown system developed at the urgent installation in which worked before coming to Blue Cross/Blue Shield. That was, he said, a two-year effort that probably cost \$50,000. "But it's nothing much more than I have here for \$4,000."

Developer's Package Describes Low-Overhead, Isam-Like Access

WATERTOWN, S.D.—Users may be able to treat sequential disk files as if they are index sequential (isam) files with an approach developed by the system department of Cook's Office Machines and Service here.

This is not a software package in the usual sense.

The copyrighted approach is described in narrative and flowchart form and illustrated by a sample program (in RPG-III) developed by the developer. But the user has to apply the concepts to each programming situation, Cook's said.

The method may be used with any sequential disk file and with any programming language that allows direct access to relative record numbers. The number of records in the file must be known, and the file must be sorted (in either ascending or descending sequence) for the approach to be successfully utilized, the company added.

Duplicate records are acceptable and the method can be used to access either the first or the last of any group.

Although it provides access comparable with index sequential methods, the Cook's approach uses the actual file data and not one or more separate indexes. Thus search overhead is reduced, and indications are that the larger the file, the more the approach outperforms normal isam, the company said.

The logic of the approach is deceptively demanding, the developer admitted. It looks obvious and simple, but must be followed very closely or the access will be reaching "Cook's knowledge," systems manager Cliff Fryds warned.

The descriptive package can be acquired for a license fee of \$1,000 and is available from Cook's Systems Department, 807 South Broadway, 57201.

Help Wanted

That certain guidelines must be followed, Brown said:

- The files will be stored only on media that adhere to American National Standards.

- The files, when stored, will be associated only with approved American National Standard labels and data organizations.

- Characteristics will be of logical aspects, i.e., storage media-independent, although the special requirements for control of certain functions such as communications control will be included.

- Asci will be the only allowed representation of the data in the interchangeable files to be standardized.

- The file types will be quite general and not application dependent.

Charters is at 1828 L Street N.W., 20036.

WASHINGTON, D.C.—American National Standards Committee X3—Computers and Information Processing—has okayed the development of a standard for interchangeable Asci data files.

The project, under Technical Committee X3.15, is directed toward establishing the required properties of data files in interchanges between dissimilar systems.

Members of the DP community interested in working on the standard "would be most welcome," according to X3's secretary, Robert M. Brown, who asked volunteers to contact him at the Computers and Business Equipment Manufacturers Association (Cbema) here.

As part of the work done to decide if such a standard would be feasible and desirable, X3 has already determined

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Distributors' Seminar Told

Remote System Aids Inventory Control, Cash Flow

By Don Leavitt
of the CW staff

TAMPA, Fla. — Computer-based monitoring of sales and inventory turnovers can bring marked improvement in both the cash flow and inventory positions of wholesale distributors, according to

panelists at a recent seminar.

The session was sponsored by Distronics Corp., the Western Union operation that provides just such processing for distributors, based on IBM 360/40 at Cherry Hill, N.J. and Maryland Heights, Mo.

The service includes turnkey installation

of programs accessible through GTE Novar terminals at user locations.

Once it moved to Distronics about two years ago, Power Drives, Inc., in Buffalo, N.Y., took a hard look at the reports being generated and discovered "nearly 20% of our inventory investment was dead stock," Paul Mansell, general manager of the fluid transmission industrial distributor told the meeting.

He had known the problem existed, but couldn't pin down the unwanted items under the manual system the company had before going to Distronics.

"The computerized system put the names of the dead items in black and white so I couldn't miss them," Mansell said.

"Because last year was a time of scarcities, we were able to return almost nearly all of this nonmoving stock to the vendor and reinvest our money in more popular inventory," he added.

Mansell was very high on the support provided by Distronics during conversion. Aside from getting the terminal, he only had to set up — "with their very able assistance" — his product file "based on suggestions Distronics made from their experience with other companies."

The program logic was provided and no maintenance is done by Power Drives. The distributor has no DP staff — "all we have is one girl sitting here slamming information through our Novar all day long," Mansell said.

Ernest Tramposh, vice-president of Refrigeration Equipment Co., a heating/air conditioner distributor in Kansas City, Mo., reported similar inventory gains through the use of Distronics, but solved another problem as well.

The company has five locations in Missouri and Kansas. The in-house IBM

System/3 had no communications support for terminal operations; Distronics obviously does.

Under his old system, Tramposh had to ship invoices and other materials overland between Kansas City and Wichita and Topeka, Kan. and Columbia and St. Joseph, Mo. The time lag that imposed put a crimp on the company's cash flow, he noted.

Inventory control was the big thing on his mind, though. "In six months, working with our five branches and studying the computer reports, we were able to realize a 30% reduction in our nonmoving items," he said.

The firm was also able to transfer stock not selling at one branch to another where the market was better, Tramposh added. Overall, the company at one time had 22,500 individual items of inventory at each location.

"We're down to 17,400 and we're going to take another good whack at it after the year-end reports are in," he said.

The application library available from Distronics is a complete package, from billing through accounts payable, check writing and general ledger, but users can choose just the portions they want. Tramposh noted his firm does "all our invoicing and invoice-related sales reports, and we're getting inventory management, but we're not on payables and general ledger though we're moving in that direction."

The move seems more likely now that Tramposh's organization is being consolidated. Each of the branches had been a separate company, and that made for some problems in bill paying, the executive explained.

With elimination of a tax advantage that

(Continued on Page 17)



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User-Formatted DOS/VS Dump Eases Debugging, Maintenance

SAN FRANCISCO — GBA Dump from GBA International is a \$425 enhancement to the memory dump routines supplied by IBM with DOS/VS. The independent package cuts the supervisor portion of a dump to a few pages of formatted information.

Under "real" DOS, the size and content of a memory dump was fairly manageable, but with the VS implementation and the vastly larger supervisor it required, the dumps have generally become unmanageable, GBA said.

With IBM-supplied routines, there are many pages of printout devoted to the supervisor and only indirect means of finding most of the information needed to debug the problem that caused the dump, the independent explained.

GSI Links Mark IV

To 'Any' Data Base

WOODLAND HILLS, Calif. — A new release of the Mark IV file management system from Informatics, Inc. features a Generalized Systems Interface (GSI) which provides access "to any data base system now available and to any which may be developed in the foreseeable future," according to the vendor.

Described as a new approach to integrating data base management systems, GSI also simplifies the cross-program communication between Mark IV and other high-level languages. The current release contains numerous improvements and emphasizes interfaces to IBM's DL/I under DOS/VS and to Cincom Systems' Total, Version 7.

Even on Siemens

Mark IV systems operate on IBM 360/370 equipment under DOS, OS, VS or CMS environments; Univac Series 70, under TDOS, and Series 90, under DOS or OS/4; and on Siemens 4004 configurations.

Unlike many enhancements, the GSI release is not being automatically distributed free to current users. The release is available to all users, instead, for \$3,700, the vendor's sales staff reported. Informatics is at 21031 Ventura Blvd., 91364.

Instead of that, GBA Dump extracts and prints with narrative captions all pertinent system generation parameters. In addition, the Program Load Address is clearly identified; the GBA Dump report shows, in so many words, "Program Load Address =" (followed by the address).

The printout also provides the user with Physical Unit Block (PUB) tables, Channel Queue tables, Logical Unit Block (LUB) tables and "all associated JIBs," GBA said.

Though the information formatted by GBA Dump "should be enough for most normal debugging," the package allows the user to switch between the new approach and standard IBM dump routines by the setting of a single bit switch under Job Control Language (JCL) or at the console, a spokesman noted.

The package is available now from GBA at 2670 Leavenworth St., 94133.

IDMS Gives DBA More Power

BOSTON — The data base administrator (DBA) has gained enhanced powers to restrict or limit each of the three major functions performed by a program under a new version of the Integrated Data Base Management System (IDMS) from Cullinane Corp. IDMS Release 3.1 also adds to the security of the data base by allowing the DBA to separate the programmer from the data even more than had been the case under previous releases.

Under the new release, any of the six usage modes — retrieval, protected retrieval, exclusive retrieval, updated, protected updated or exclusive updated — may be individually "locked" (disabled) for each area in the subchema.

In the same vein but at the record level, any of the Data Manipulation Language (DML) commands — Find, Get, Obtain, Store, Delete, Modify — may be individually locked for each record in a subchema. This provides

the DBA with still another level of control over the data base.

The set-oriented DML commands — Insert, Delete — may be individually locked for each set in the subchema.

Improved data independence is available in IDMS Release 3.1, according to Cullinane, with the newly implemented ability to select only certain data elements or groups in each record to be "seen" by a program through the subchema.

With this added support, record occurrences in an IDMS data base can be expanded and elements or groups in the record reordered without impacting application program logic or even forcing recompilation.

Basic IDMS for IBM 360/370 gear costs \$37,500. Users expecting to run multiple tasks concurrently will also need the Central Environment module for an additional \$7,500, a Cullinane spokesman noted from One Boston Place, 02108.

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Data Communications

Course #1010—

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Chicago—Jun. 23
Orlando—Jul. 23

Washington, D. C.—Jun. 9-10

Course #1020—

Advanced Teleprocessing Systems Analysis and Design

This course is a follow-up to Course #1010, with special emphasis on problem solving techniques for minimizing operating costs in commercial data communications networks. Also led by Dr. Dixon Doll, the course covers procedures, approaches and algorithms for evaluating and cost optimizing network organizations. This seminar runs three days, and total cost, including an extensive set of customized course materials, luncheon and continental breakfasts is \$450. Additional registrants from the same company qualify for a reduced rate of \$400. Current schedule is as follows:
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Data Base Design

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- Effective Record Design
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- File Integration
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Given in association with Leo J. Cohen and Performance Development Corporation, this course reinforces the lecture material with workshops, in which attendees apply the techniques just learned, to practical problems.

You should attend this seminar if you are (or will be) involved in the design and/or implementation of a data base system and whether as a Data Base Designer, Planner or Analyst. This course runs for 3 days and costs \$350, including course materials, continental breakfasts and luncheon. Additional registrants from the same company qualify for a reduced rate of \$300. Current schedule:

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You should attend this seminar if you are involved in the purchase of EDP equipment or services, whether as a corporate controller, contract administrator, DP manager, consultant or officer of a using firm.

Cost for the entire 2½ day seminar, including complete resource notebook, continental breakfast, luncheon and coffee break is \$295.00. The current schedule:

Atlanta Stoufferts Atlanta Inn April 23-25
New York St. Moritz June 4-6

Performance Evaluation and Improvement

A seminar actually designed to save your installation money.

This course starts with a discussion of questions and specific problems attendees have about system performance at their own installation. Then step by step each attendee will learn the methodology necessary to understand the problems and implement the answers. The techniques presented at this seminar are in effect at numerous installations today, and have extended the life of one S/360 for more than two years—a savings, at last estimate, of more than \$700,000 for one user.

Our course leader is Saul Simler. His book, *Data Processing Systems: their performance, evaluation, measurement, and improvement*, will be an important part of the seminar. As well as case studies, topics that will be covered include:

- Criteria for quantifying performance • Pencil and paper analysis of a system
- Benchmarking techniques • Realtime, batch, and interactive time sharing systems
- You should attend this seminar if you are a data processing professional or corporate executive whose responsibility it is to plan, benchmark, evaluate, or improve data processing systems.

Cost for the entire seminar, including continental breakfasts, luncheon, and all course materials (including a copy of Saul Simler's book on the subject) is only \$250.

Current schedule:
New York Waldorf-Astoria May 5-6



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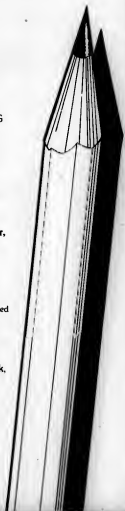
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through binding.
Thank you.



COMPUTERWORLD



'Audit/5' Watches Utilization, Cost Factors of CICS Resources

SACRAMENTO, Calif. — Audit/5 from Software Module Marketing (SMM) is an on-line statistics and cost allocation system designed for installations operating under IBM's Customer Information Control System (CICS). It can be used with all versions of CICS except DOS/Entry, the vendor noted.

Developed by On-Line Software International, Audit/5 gathers statistics about communications line utilization, transaction file utilization and terminal connect times.

Terminal activity, program activity and program logic paths used are also documented, SMM said.

NCR-Based 'Labeller' Is Load/Go Package

AUBURN HEIGHTS, Minn. — Users of NCR Century CPUs can access any standard disk files and print mailing labels from them in a variety of layouts, from 1-to-4-up, with parameter card entries and the Labeller package from L/V Associates.

Preparation of the English language control card options does not require DP experience, the firm stressed, and changes can be made dynamically since the package provides a generalized load-and-go approach to the label preparation problem.

Labeller prints user-specified fields from files anywhere on the label or print line, but also has the capability to print as many as seven different constants on seven different lines.

In addition to supporting various forms of input, Labeller provides several choices for output. The user may, for example, print a specified number of labels, regardless of how many records are in the file, or the system can be set to print every Nth record.

The program requires 16K of memory and can be used on any NCR Century CPU. It is available now for \$300 from L/V Associates through P.O. Box 4175, 48075.

Remote System Backs Inventory, Cash Flow

(Continued from Page 14)

favored the separate companies, refrigeration equipment is going to a single accounts payable system.

Daniel W. Judge, administrative vice-president of Ward Brothers Mill Supply Co. Inc., an industrial distribution firm in Lockport, N.Y., reported his company was able to realize a 15% reduction in inventory within the last year.

"We studied every single product line in our inventory," Judge said, "and we eliminated one line entirely because we learned it was not selling effectively."

Judge also said the cash flow resulting from a decrease in inventory helped the firm in buying a new branch and in renovating its headquarters offices. "We wouldn't have been able to do any of this without the computerized reports," he said.

A 50% reduction of nonmoving stock within the last year through use of computer reports was reported by Mel West, director of inventory and purchasing at Capital Plumbing & Heating Supply Co., a plumbing/heating/worksheets distributor in Springfield, Ill.

He told the seminar his firm's use of the inventory reports was invaluable in providing sums of money for use on expansion programs. "With our four branches, we've been able to use the money we had invested in dead inventory to reduce the money we would have had to borrow to expand," he said.

"And with the prime interest rate being as high as it is today, that sum is very significant."

The package can also be used for obtaining cost-accounting information about internal CICS operations. Data collected could serve as a base for bill-of-materials organizations, a spokesman suggested.

Audit/5 reports provide information for tuning CICS, restructuring logic paths and determining areas of high activity.

Requests for standard reports and cost assignment for the various CICS entities are entered through control cards. The package also has a facility for creating reports formatted to user specifications.

The data gathering portion of Audit/5 can be initiated from any supervisory terminal. The reporting portion if executable under either DOS or OS as a batch program, requiring 20K plus space for access methods and sort routines.

Source code (ANS Cobol) and installation instructions are available for \$400 from SMM at 1007 Seventh St., 95814.

Librarian Runs in 32K

EMERYVILLE, Calif. — Maxima Systems Group has developed Maxi-Lite, a program library maintenance and protection system that is said to have several advantages over previously available library packages.

Operating under either DOS or OS on IBM 360 and 370 mainframes, the system captures 80-column card images on one or more highly compressed Basic Direct Access Method (Bdam) file libraries.

The compression is accomplished by stripping out blanks, sequence numbers and programmer identification from the original card formats, Maxima explained.

Maxi-Lite controls source code, object code, Job Control Language (JCL) procedures and data. Changes become part of an audit trail which — when used in conjunction with file backup routines and passwords — make the system part of a total security approach, the firm added.

The package supports tabular key-

word compression for as many as 128 keywords, compressing each into two bytes. INCLUDEs, nested through as many as seven levels, are useful to Cobol and PL/I programmers and to systems planners working with JCL procedures.

Cobol shorthand is part of the standard Maxi-Lite package, easing both the source code storage requirements and the programmers' original coding effort. The system expands the abbreviated code to full Cobol statements at compile time.

Support for single-pass scan-update-delete-replace types of operations simplify control card usage and reduce overlay operations of the maintenance programs, a spokesman added.

Maxi-Lite will fit in a 32K byte DOS partition but can be used with OS as well. The package is now available for \$2,227 under perpetual license, or \$119/mo for DOS. The OS prices are \$2,662 or \$148/mo.

Maxima is at 1475 Powell St., 94608.

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The PBW Stock Exchange recently installed America's first automated stock exchange trading system. The entire turnkey package, named Centramat®, was designed by INCOTERM, including the specifications for the mainframe and development of all the associated software.

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The PBW Exchange looked at the long list of INCOTERM blue chip customers: banks, railroads, hotels, hospitals, airlines, manufacturers, and local, state and federal governments. Of all programmable equipment on the market INCOTERM has continually proven to be the best long-term investment.

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If you think all disk packs are alike, take a closer look at the BASF 1236.



Because all disk packs conform to certain industry standards, you might think they're all equal. They aren't. The important difference is the extent to which a manufacturer is willing to go in order to exceed industry standards. It's a matter of making a disk pack better than you really need, because there could be times when you need it. Let's look at a few superior points of the BASF 1236 disk pack:

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As you probably know, magnetic coating doesn't stick to the aluminum disk all by itself. We use a special binding agent to produce an incredibly strong bond. The disk is sealed to prevent oxidation, so you can be sure that the coating won't peel or flake off.

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As the trend toward higher packing densities continues, it becomes increasingly important to monitor the thickness of coating deposited on the disk. The problem is compounded by the necessity for progressively varying the coating thickness from the outside toward the inside of the disk, because packing density is greater as the circumference decreases. For those reasons, we've discarded conventional coating methods in favor of an exclusive process using our own BASF-designed equipment.

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Following the coating operation, we use our own exclusive polishing process to achieve optimum surface regularity. We've been able to achieve a surface so flat that the possibility of a head crash being

caused by uneven disks is completely eliminated. We might mention here that the coating and binder formulation, combined with coating and polishing techniques, all are important factors in achieving surface hardness, which is the ability of the coated surface to survive excessive or extended head loading.

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Our 1236 costs no more than other twelve-high disk packs. You're already paying for BASF quality... you might as well have it. For more information on the 1236 or other BASF disk packs or cartridges, write to BASF Systems, Crosby Drive, Bedford, Massachusetts 01730.

You're already paying for BASF quality, you might as well have it.



COMMUNICATIONS

Will Make Cost Evaluation Different

Teenet Packet-Switched Net to Charge by Kilopacket

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. — When Teenet Communications Corp. begins packet-switched network operations in June, users will have to evaluate the new type of service on both a cost and reliability basis. The more difficult evaluation will come in the cost area because packet-switched data is priced according to a different throughput concept.

The Teenet packet will consist of 128 characters and be priced at \$1.25 per kilopacket. This price is tentative and could change when the carrier files its first tariff, but even at this rate it will be hard for the data user to relate the packet pricing to existing, known throughput parameters.

In order to simplify the process, Teenet has made some typical simulation assumptions to give users a measure of packets that relate to commonly used terminals. An IBM 2780 remote batch terminal transmitting at 2,400 bit/sec, for example, has an average efficiency of 1,200 bit/sec and, with a ratio of four to one, the terminal would transmit about 4,200 packets/hr.

A printer/CRT combination used in an order entry application and transmitting at 2,400 bit/sec would have an average efficiency of 315 bit/sec and would equal 1,400 packets/hr. A Texas Instruments 733 time-sharing terminal with a line speed of 300 bit/sec would have an average efficiency of 37 bit/sec or 700 packets/hr; and an IBM 3270 transmitting at 2,400 bit/sec in an order entry environment would have an average efficiency of 50 which translates to 300 packets/hr, according to Teenet.

The least efficient would be point-of-sale (POS) terminal operating in a retail store under a polled application. If the terminal transmits at 1,200 bit/sec, the efficiency would be only 5 bit/sec or 25 packets/hr.

The efficiency figure quoted for each type of application is based on a typical system. The most directly applicable data is for the time-sharing application, since this could be compared with user patterns on the packet-switched Arpa network, a Teenet spokesman said.

About 12 systems were averaged for the 2780 estimate and the order entry data was compiled primarily from systems operating in the insurance and manufacturing industries. The smallest sample came in the POS area with less than 12 systems. In all cases, the estimates apply to typical systems but are nevertheless considered adequate for users to figure Teenet transmission costs.

A network comparison was made for an order entry system now operating over private lines in 18 multimultiplier cities, with 80,000 peak hour transaction/hr. Current line costs for this type of system

are about \$14,000/mo. Teenet said.

If the same net were operating with Teenet service, the line costs would be about \$11,500/mo. In both cases the net would operate at 2,400 bit/sec.

This type of user would also realize a savings in maintenance staff, which would be taken over by Teenet, and reliability would increase from an estimated 4% error rate to 1/25 errors on the line, the company said.

Network Startup

The carrier expects to begin operations between Boston, New York and Washington in April. Each city will include two Terminal Interface Processors (TIPs) which are modified Prime 200 minis.

The primary network control center will be located in Washington and will include dual Prime 300 minis with four disk and four tape storage units. The center will begin operating in March and will utilize

extensively the capability of initiating diagnostics at any point in the planned packet-switched network.

Typical TIP

A typical TIP will handle 64 terminals at 2,400 bit/sec or 200 terminals at 300 bit/sec. The TIP contains about 64K which consists of a terminal interface controller for front-end software; a host interface program to handle mainframes; and an interface message processor which acts as a store and forward program for the network.

The greatest savings for smaller users who select Teenet will be in the hardware area, since this type of company typically will not be able to afford the hardware capability which the packet-switched net provides.

For the larger user, the greatest benefits will lie in the network management savings which this type of company will get



Test message is entered by Cathy Foley into prototype TIP processor that will be operating on the Teenet packet-switched network. Several TIPs are now being tested in local mode at the firm's office.

from packet-switched service, a Teenet spokesman said. The carrier is at 1666 K St., N.W. 20006.

Controllers in Networks — Part I

Terminal Management Vital to Successful Systems

By A. Gordon Osborne

Special to Computerworld

Telecommunications distributes the power of centralized computers to remote users, whether on a real-time basis in which computations are made at inputs are received, or on a batch basis in which inputs are scheduled to run on a periodic basis.

Estimates of the annual increase of data traffic in the U.S. during recent years approximate 35%, and the trend is expected to continue.

The terminal control unit, or communications controller is a vital link in the process, interfacing remote and local terminals to a computer and relieving the user of many necessary housekeeping chores which otherwise would seriously degrade computer performance.

Loss of a communications terminal temporarily and the result probably will not be of serious consequence — but loss of a controller and the entire network will be affected. Use a controller unit with restricted capabilities, and future enhancements to a network may be hampered.

Clearly then, shopping for a controller, evaluating the functions available, is a vital part of the entire equipment selection process when adding communications capabilities to a computing resource.

Don't Shop Right Away

Probably the first recommendation to management facing the decision of selecting a controller is "Don't" — that is, until several higher priorities are successfully established.

The needs of remote users — the type of

data required, when it's required, estimates of immediate and future volume of data, etc., are paramount and eventually dictate the type of terminals selected for a network. Choosing a controller without first isolating user requirements could severely restrict the choice of terminals.

A feasibility study of end-user requirements must also preclude selecting inappropriate terminals. It might pay to be leary of slow-speed terminals — Selectric-type terminals which print at a speed of 15 char./sec. for teletype, or 10 char./sec. for Teletypes. A conversion to faster terminals might come sooner than anticipated.

Another critical prerequisite is software. Much of the telecommunications software that is provided by the mainframe manufacturers to support terminals requires the user to code his own software.

This software may consume an inordinate amount of central processor memory. Many independent software houses have developed specialized telecommunications expertise: some have experience in specialized industries. The better houses have efficient, off-the-shelf, low memory-consuming packages which could mean the difference between a fast implementation and a year's delay.

Operating Features

Assume software and terminals appropriate for the mainframe and teleprocessing needs are chosen. Like most of the nation's terminal installations that now employ data communications (approximately one-third with an average of approximately 43 terminals each), probably not all the terminals will have identical

operating features:

Some, for example, will transmit data at different speeds, while others may not speak the same language, or code, as the mainframe. Herein lies some important considerations when evaluating controllers.

A controller that can recognize and adapt to speeds of transmission, different bit rates, simplifies the use of dissimilar terminals. Without an automatic speed recognition feature, transmission lines must be dedicated to each rate of terminal speed.

With automatic speed recognition, the computer can accept any phone call in a dual-speed environment within the range of the speed recognition device.

Code conversion capabilities give the user a wide latitude in selecting terminals. Many IBM terminals, for example, utilize a 7 bit/char. code called Binary Coded Decimal (BCD). Most independent terminals, however, use American Standard Code for Information Interchange (ASCII) code, an 8 bit/char. code.

A controller with code convert capabilities bridges this language gap by translating the ASCII-generated code into the BCD code set. Thus the user may select terminals from numerous sources.

From ASCII-to-BCD conversion, the independent terminal appears like an IBM 2741-type Selectric terminal to a System 370. Standard IBM software supporting the terminal may be used. Yet the user gains a print speed of up to 120 char./sec. instead of 15 char./sec.

Additional controller code conversion

(Continued on Page 21)

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Firm Scraps Teletypes, Cuts Processing Time in Half

MINNEAPOLIS — A major food processing firm here has replaced its remote teletypes with intelligent terminals in an effort to shift the bulk of its customer order processing to the regional sales offices where orders originate.

By scrapping its Model 33 and 35 Teletypes for Datapoint 2200 CRTs, General Mills also hoped to save line time by increasing transmission speed and to improve the print quality of hard copy reports, Donald Peterson, manager of operations for the company's DP department, said.

Such hopes have been more than met, company officials commented.

"We've managed to save 50% of the preparation time previously required at field locations for order processing," Roger Weaver, systems operations manager for the company's marketing and sales support system, noted.

"Though the terminals are used primarily for order entry," he said, "we want to add control and reporting func-

tions because the system is working so well."

Developed in-house, the product movement system depends on some 34 Datapoint 2200s installed in 21 regional sales offices, six mills and two plants last April,

teletypes due to format errors during input and an occasional misplaced character in output received by the remote locations.

"With the CRT terminals, the error rate has dropped to less than 1%, and any

puter center via dial-up lines and Datapoint's Com-Adapter, which combines a 2200-402 communications adapter with a Bell 202 modem.

Batches of order information are sent to the company's Burlington, B6700, which is dedicated to production. A few Datapoint terminals are also connected to a second B6700, but this mainframe is devoted to coding and application development, Peterson remarked.

The B6700 is programmed to perform additional error checks and, if the required conditions are not met, the machine signals the need for retransmission of order information.

Peterson commented that once orders are processed Minneapolis sends loading orders, bills of lading and inventory counts to shipping points, including plants, mills and distribution centers.

When orders are filled and shipped to customers, notification is transmitted to the Minneapolis center where inventory is adjusted and customer accounting completed. The center then transmits shipment advisory memoranda back to the appropriate regional sales office for customer record control, Peterson said.

Satisfied With Service

General Mills has been generally satisfied with the service support received from Datapoint Corp., Peterson remarked. But service support does vary geographically, depending on where the vendor has a customer base established, he said.

"Some of our mills are out in the cornfields, and delays have resulted when Datapoint has had to fly service people into the area," he explained.

While he would like to see this aspect of support improved, Peterson added he has no major complaints with the vendor's service efforts on General Mill's behalf.

The food processing firm originally went with the 2200s because they are fully programmable and can be upgraded to faster speeds, O'Toole said. "At the time, we anticipated going to 1,800 bit/sec, although such speed doesn't seem appropriate now."

In addition, the devices operate in asynchronous mode. O'Toole noted the company also evaluated Sycor and IBM terminals, but discovered their bisynchronous transmission didn't interface well with Burroughs equipment.

General Mills eventually plans to shift more of its payroll processing to the remote locations. The terminals will receive data in batches and, acting as remote extensions of the Minneapolis B6700s, will print all payroll checks and other required documents, Peterson said.

The company also expects to acquire more terminals for its distribution centers and food packaging plants. Because the applications of these locations are more inventory control-oriented, however, the devices will have to have higher printing speeds and a disk storage capacity.

GDC Modem Operates Over Private Lines

WILTON, Conn. — General Datacomm Industries, Inc. (GDC) has a synchronous, binary, serial 4,800 bit/sec. modem designed to operate over Bell unconditioned 4-wire Type 3002 private lines. It is fully compatible with the 208A data set.

The GDC 208A is a solid-state and features a startup time of 50 msec with automatic adaptive equalization.

Designed for continuous carrier or controlled carrier applications, full or half duplex, the GDC 208A can be used in multipoint polling applications.

The 208A switches from "request to send" to "clear to send" in less than 50 msec in controlled carrier operation, the firm said.

Price of the GDC 208A is \$3,600 with delivery in 30 to 60 days from 131 Danbury Rd., G0897.

Terminal Transactions

Peterson explained. Each CRT includes an 8K memory, a 30 char./sec. serial printer and a programmable communications adapter, he added.

As operators key orders into the terminal, the device automatically subjects the data to various levels of verification. If an operator enters an illogical code, the 2200 signals the error with an auditory beep, preventing completion of the order until a correction is made, Peterson said.

The group leader of data communications, Jim O'Toole, recalled a 10% to 15% rejection rate of the data processed on

corrections can be made much more rapidly," he said.

When satisfied with an entered order, the operator signals the end of the message and both the variable and the fixed-format data shown on the display screen are stored on tape cassette. Peterson noted that during this procedure the terminal continues to perform error detection routines on the data, notifying the operator of any necessary corrections.

At intervals during the day, under operator command, the terminals link the remote locations to the Minneapolis com-

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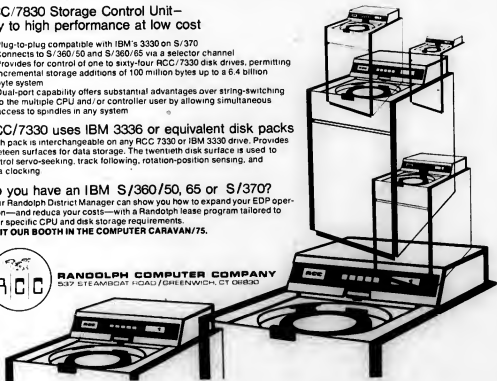
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An Introduction to the Lingo

Print speed conventionally is referred to in char./sec, presumably because the end result appears in alpha or numeric characters.

The term "byte" refers to a unit of information operated on in a computing system. It is also used to refer to a character and, in addition, can describe a specific instruction or memory or address.

Transmission speeds traditionally are stated in bit/sec. The bit terminology is more useful when talking transmission speeds because different codes employ different numbers of bits to represent a character.

Seven bits, for example, comprise a character in the Binary Coded Decimal (BCD), whereas an 8-bit code represents a character in Ascii code.

A bit refers to a pulse transmitted along a wire. Its position in a coded stream of a character is represented by a 1 (bit) or zero (no bit), the presence

or lack of a signal.

In BCD the letter "A," for example, is represented as follows:

(pulse)
(bit)
0 1 1 0 0 1

"Baud," a byproduct of the telegraph, may or may not equal the number of bit/sec transmitted. The term refers to the signaling speed of a transmission line, the number of times per second the line condition changes. In asynchronous transmission baud rates and bit rates are usually the same, a baud equalling a bit.

With phase modulation, however, which is often adapted in asynchronous transmission, a baud may be broken into sections wherein a baud may equal two and sometimes four bits.

The easiest way to handle a baud dropper is to tell him to talk in bits.

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Controller Vital Key To Systems' Success

(Continued from Page 19)

capabilities, depending upon terminal characteristics, may be utilized to convert Ascii-generated codes to other codes, such as Extended Binary Coded Decimal (EBCD) Correspondence Code terminals (used in textual applications) and Extended Binary-Coded Decimal Interchange Code (Ebcidic).

Consider the Support

Some mainframe manufacturers will support, software-wise, only their newer terminals on their newer controllers. This saves the manufacturer programming dollars and possibly upgrades its terminal population.

Thus, to continue using an older but satisfactory terminal could require using an older controller which may, for capacity reasons, be unsatisfactory.

In addition to speed and code, terminals are classified as either synchronous or asynchronous. The distinction applies to the mode in which a terminal handles bits.

Asynchronous terminals require start/stop bits immediately preceding and following a string of bits to identify those bits representing a character. Synchronous terminals contain extra circuitry instead of sensing start/stop bits to perform this character isolation chore.

Asynchronous transmission often is referred to as start-stop transmission. Synchronous transmission, devoid of start/stop bits, is more efficient and faster. Controllers are available which support both modes of transmission should the user's mix of terminals involve both modes.

Gabriel is product marketing manager for communications equipment at Memorex Corp.

Users in Eight Cities Can

Get Calcomp VTS in 90 Days

ANAHEIM, Calif.—California Computer Products, Inc. (Calcomp) has announced its Virtual Terminal System (VTS) is available for delivery 90 days after receipt of order in eight cities: New York, Washington, D.C., Boston, Chicago, Philadelphia, Houston, Los Angeles and San Francisco.

VTS, which is manufactured by the Bregan Corp., a Calcomp subsidiary, consists of an intelligence module (controller), up to 12 video display terminals in the basic configuration expandable to 60 terminals and various peripherals.

It is said to satisfy a broad range of data communications requirements for IBM 360 and 370 users.

Calcomp is at 2411 West La Palma Ave., 92801.

IF YOU LIKED STRUCTURED PROGRAMMING, YOU'LL LOVE STRUCTURED DESIGN

Structured design is a new and highly disciplined form of modular design—a concept that can be applied to both system design and program design. It is based on original research carried out in 1965-68 by Mr. Larry Constantine, a YOURDON inc. staff instructor; the theory was further refined during Mr. Constantine's tenure at IBM's System Research Institute in 1968-72; the major results of that work were published in a paper by Constantine, Myers and Stevens in the spring 1974 issue of the *IBM Systems Journal*.

The major objective of structured design is to divide a system or a program into pieces in such a way that individual pieces can be considered, implemented, fixed or changed without affecting the rest of the system. In order to evaluate various alternative designs that may evolve during the attempt to reach this objective, we explore the connections and relationships between modules. Two of the concepts that are used to describe inter-module relationships are *coupling* and *binding*. In order to achieve the ultimate goal of "simple" systems, we want to have the smallest possible number of interconnections between modules, as well as connections that do not strongly "couple" one module to another. Coupling is a measure of the strength of association established by a connection from one module to another; the extent of coupling depends on how complicated the connection is, whether the connection refers to the module itself or something inside it, and what is being sent—data or control. The seminar explores various types of coupling, and provides strategies for minimizing inter-module coupling.

Structured design also achieves its goal by maximizing the relationship among elements (e.g., sub-modules and/or instructions) that are in the same module; the intention here is to ensure that those elements that are grouped into a

module; the intention here is to ensure that those elements that are grouped into a module by the program designer deserve to be in a module. This introduces the notions of "cohesiveness" and "binding"; a system whose modules are highly cohesive will tend to be simpler and easier to maintain. The seminar discusses six levels of cohesiveness, gives examples of each, and provides the programmer with guidelines for achieving the desirable level of functional binding.

Several additional concepts and strategies are introduced in the course to further explore the relationship between modules in a large complex program or system. Since most programmers and designers are totally unfamiliar with these concepts at the current time, great care is taken to use a variety of examples and case studies throughout the course to illustrate the concepts.

Structured design is not concerned with programming *per se*, though it is highly compatible with the more widely known concepts of structured programming and top-down implementation. Similarly, structured design is not concerned, *per se*, with such documentation techniques as HIPO—on the other hand, the structured design seminar describes a form of "structure charts" (similar to, but more formal than HIPO) that can be used to describe progressive levels of design.

INSTRUCTORS: Edward YOURDON, President, of YOURDON inc. and Larry Constantine, independent consultant and co-author of the article *Structured Design* (*IBM Systems Journal*, vol. 13, no. 2, 1974).

FEE: The fee for this 3-day course, including all course notes and materials, lunch, and a continental breakfast, is \$395.

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Computerworld is engaged in a research project on Systems Houses, and if your company can answer yes to that question, we'd like to know a little more about you. In return, we'll send you a 3" x 8" metric/inch slide rule converter. It's compact, sturdy and very useful—with 15 different conversion tables built in. To get it, just fill out the coupon and send it along to the address indicated. Thank you very much.

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COMPUTERWORLD

Adds Introduces MRD 980 CRT, TTY Replacement

HAUPPAUGE, N.Y. — Applied Digital Data Systems, Inc. (Add) has introduced an addition to its line of CRT terminals. Called the MRD 980, the terminal is teletypewriter-compatible and is a rack-mounted version of the earlier Consul 980.

Among the features standard on the terminal are upper/lower case display, extensive operator editing controls, a graphics capability and various peripheral and communication line interfaces, Adds said.

The terminal can display formats consisting of fixed data, displayed as gray characters. The operator can then fill in the blanks with variable data, displayed as black characters.

The MRD 980 has an audible alarm to notify the terminal operator that the CPU has an important message. It also allows the CPU to read the current cursor position of the terminal. Delivery of the MRD 980 is 60 days. The price, not including the keyboard and TV monitor, is \$1,995. Adds is at 100 Marcus Blvd., 11787.

Print, Plot Options

Available for GSI-300

FOSTER CITY, Calif. — Gencom Systems, Inc. (GSI) has added two print spacing and plotting options to its GSI-300 terminal.

Super Option is a composite of such features as half-line feed, half reverse line feed, superscript and subscript.

Two-color ribbons are supported and there is a perforation skip capability. Character spacing with Super Option is under complete user control from 1/60 of an inch through 7/60 of an inch.

Super Plot enhances the terminal's plotting throughput by as much as a factor of five, the company said.

Super Plot interprets each Ascii character not as a printing character, but as a vector determined by the bit configuration of the Ascii character, GSI noted.

When an Ascii character is received, the firm explained, the terminal makes a vector movement before printing a "plotting character" which has been loaded into the terminal's memory.

Each option leases at \$15/mo or can be purchased for \$300 from the firm at 1151 Triton Drive, 94404.

T-BAR Cross Over Switches... simple channel interchange in a single switch!

T-Bar Cross Over Switches are available in configurations with 2 and 4 paired channels and come with three basic controls: Manual, Local, Computer and ASCII Unattended Remote, for either rack or wall mounting.

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Minibits

Amplex 16K Add-On Modules

Transparent With DG 1200s

REDWOOD CITY, Calif. — Amplex has begun deliveries of 16K add-on memory modules totally transparent with Data General (DG) 1200 minicomputers.

The Amplex ARM-1200 modules are said to offer twice the memory on a single board at a cost savings of 20% on memory costs and up to 50% on the number of card slots devoted to memory.

Cycle time is 1200 nsec and access time is 360 nsec. Each module is supplied with an address strapping plug used to establish either a single 16K address field or up to four nonsequential 4K address fields for the memory module.

The modules operate in any address field including extensions beyond 32K.

Field support is simplified by uniformity and module-to-module interchangeability within a CPU or between CPUs, according to the company.

The ARM-1200 is priced under \$2,000 from the firm at 401 Broadway, 94063.

HP Cuts 21MX Price Tags

CUPERTINO, Calif. — Hewlett-Packard (HP) has reduced prices on its 21MX systems up to 18% by passing on reductions in the prices of its semiconductor memory modules.

The company has dropped the memory module prices by 30%.

The lower prices apply to the 4K and 8K modules of medium-density, 22-pin semiconductor memory. Price of the 4K module has been lowered to \$900 from \$1,300; the 8K module to \$1,500 from \$2,150.

Now 32K of memory can be bought for less than \$4,000, HP said.

"The engineering tests demonstrate a Mean Time Between Failure (MTBF) improvement of between 48% and 57% over the HP 2100A core memory machines," HP claimed.

A 32K system has been reduced 18% to \$11,800 from \$14,400; the 16K system 15% to \$7,650 from \$8,950; and the 8K system 10% to \$6,150 from \$6,800.

APS Module Fits DEC PDP-11s

LIVERMORE, Calif. — Applied Peripheral Systems, Inc. (APS) has released an address select/interrupt control module for the Digital Equipment Corp. PDP-11 series of minicomputers.

Asic-11 is a single-card replacement for the DEC M105 and M7820 modules but consumes 30% less power with three times the drive fanout, APS claimed.

Interrupt vector and device register addresses are jumper selectable; DIP switches may be ordered as an option.

Priced at \$150, Asic-11 is available from the firm at 1781 Barcelona St., 94550.

While Service Bureau Costs Climb

Firm Comes to Terms With 'Reality'

LEUCADIA, Calif. — Dyna-Med, Inc. (DMI), a manufacturer and distributor of emergency medical care products, recently found the cost of keeping tabs on its inventory with the use of a service bureau was climbing quickly — too quickly. So the firm made an extensive review of its computer situation and discovered a new solution to its DP needs — a real-time mini-based system.

Dyna-Med serves the rapidly growing paramedical market. The company started in 1968 with a single product and now carries 2,344 items, ranging from adhesive tape to complete ambulance equipment packages, in its total line.

The need for an inventory control system is crucial in Dyna-Med's method of operation. Most of its sales come from a 165-page catalog, with orders mailed or phoned in.

The customer base includes over 5,500 emergency equipment users, both domestic and foreign. In an average day, about 200 orders are funneled into headquarters, and the need for products is often critical. DMI prides itself in shipping within 24 hours.

Needed In-house System

To keep a close watch on its inventory — and to keep customers content — Dyna-Med instituted a computerized inventory control program about 18 months ago.

HAYWARD, Calif. — Qantel Corp.'s 800 and 900 systems are now commercially available. These systems are the least expensive in the Qantel line — the disk-based System 800 sells for less than \$2,000.

The 800 and 900 utilize QIC, the firm's English-like application language. Both systems are field-upgradable to larger Qantel systems, and at time of upgrade 100% of the system value is counted toward purchase of program-compatible larger systems, the firm said.

System 800 has, in addition to Qantel's CPU with 4K bytes of user memory, 6M characters of disk — half fixed and half removable — and a 45 char/sec keyboard/print terminal.

User memory is protected, and the file's problem-solving package, Solution, is supported.

System 800 has a sale price of \$19,500 and a 66-month lease price of \$449/mo. System 900, priced at \$24,900 and leased at \$573/mo, provides the same basic user and disk memory, but also includes an auxiliary 45 char/sec printer and a 960-character CRT terminal.

Both systems can accommodate higher speed printers up to 300 line/min; a larger screen, 1,728-character CRT terminal,

It started with a nationwide timesharing service which was very reliable but, with Dyna-Med's volume growing, it became cost-effective to consider an in-house computer at average monthly DP charges of \$1,000 sketched in one year from \$1,000 to \$3,500.

Information lag posed an additional problem. The old system was a batch operation, working from one terminal at Dyna-Med. All information was prepared off-line, then read from the terminal's cassette once a day.

Data was batched at night and, if everything went right with the computer and phone service, invoices and reports were available the next day. Dyna-Med personnel, however, had to make a 50-mile round-trip drive to San Diego to pick up the data at the printing site.

The search began for an in-house system to reduce costs and provide real-time data. It was headed by Gus Giobbi, director of Dyna-Med's DP division, and Harvey Short, director of computer system development.

Visited Other Users

Their review began by visiting other computer users in the area. But costs looked staggering to Giobbi and Short — a large-scale computer with the minimum hardware configuration they needed ran in the neighborhood of \$250,000.

One popular minicomputer-based sys-

tem cost \$155,000 without a tape drive and could not, in practice, accommodate the five terminals Dyna-Med required.

Giobbi and Short, who together have 27 years of experience in real-time computers, then considered building their own system from components, but they quickly ruled out this hybrid approach because they wanted a system that would be immediately productive.

Their next step was to invite vendors to provide an in-depth review of 14 different systems, complete with initial and maintenance costs. The vendors were instructed to specify a configuration based on Dyna-Med's requirements. Giobbi and Short then put the manufacturer's data into a table with 35 points of comparison.

With this table, they could compare systems point by point. They soon decided on Reality, a system manufactured by Microdata Corp. Irvine, Calif. This system had the main memory capacity they needed for future expansion, multiple programming capability and room for CRT expansion.

Hardware cost less than half the original estimates. The \$80,000 Reality system Dyna-Med purchased consisted of a Microdata minicomputer, two disk units, a tape drive, line printer and five CRT terminals.

A key feature is that the Virtual Mem-

(Continued on Page 24)

Qantel Low Cost Systems Can Be Field-Upgraded

and disk memory expansion up to 12M bytes (half removable and half fixed).

Peripheral devices, including magnetic tape drives and card readers, are available, and data communications capabilities can be added, the firm said.

Solution is a series of application programs geared specifically to the wholesale distribution industry. The package is priced at \$5,000, with modifications permitted. It is designed to be used on Qantel Systems 800, 900, 1100 and 1200.

Among the accounting and inventory control programs and report capabilities available to wholesale distributors using Solution are:

- Order processing, with automatic extensions and verifications of amounts and terms.
- Order printing, including back orders, return orders, picking lists and order summaries.
- Maintenance and inquiry on entire orders and line items within orders.
- Accounts receivable, including invoices, credit and debit memos, summary and back-order registers, cash receipts journals, customer statements, trial balances and aged accounts receivable.
- Accounts payable, including checks,



Qantel System 900

vouchers and payment registers.

- Inventory analysis of quantity on-hand and on order, orders committed and available and recommended returns.
 - Sales analysis by item, by salesman and by customer; year-to-date vs. last year; and percentages of profit and sales commissions.
 - Payroll, including check printing through the W-2 form, hourly and salaried, plus labor distribution reports and seniority listings; and general ledger.
- Qantel is at 3525 Breakwater Ave., 94545.

FREE GUIDELINES FOR DEVELOPING PROJECT ESTIMATES

Managing resources and projects to come in on-time and within budget is a tough job! Seat-of-the-pants estimating often complicates the situation further. Perhaps this free pocket sized reference card will be of value to you! It has helped others, and it's yours with our compliments. It contains the following information:

- System Step Complexity Table
- System Analyst Experience Table
- Programmer Project Knowledge Table
- Programmer Experience Table
- Program Complexity As Shown By Program Functions Table
- Program Complexity As Shown By Input/Output Characteristics Table
- Existing Software To Be Used For Another System
- Utility or Package Programs

Please help us complete our survey by answering the following few questions. Thanks.

1. Do you have an automated project control system? ☐ Yes ☐ No ☐ One ☐ Two ☐ More
2. Do you intend to seriously consider buying a project control system? ☐ Yes ☐ No ☐ Perhaps
3. Your computer type? ☐ Yes ☐ No ☐ Perhaps
4. Your S&P staff size? ☐ Yes ☐ No ☐ Perhaps

Thanks again, your Project Estimate Guidelines will be sent to you promptly.

Robert P. Wolk, V.P.

Atlantic Software Inc.
51N & Chestnut Sts. #201A, Pa. 19106 • 215-922-7500

User Comes to Terms With 'Reality'

(Continued from Page 23)
 Operating System operates through firmware, not memory, Giobbi stated. With this arrangement, most of the main memory is available to the user for running application programs.

Another mini-based system they had reviewed had 48K bytes of memory, but full 30K bytes were used by the operating system.

Giobbi stressed that users should emphasize their software development because "this is particularly important in real-time operation, where a number of people can be accessing the same files at the same time. Here, the software needs more protective coding," he said.

Terminals in Dyna-Med's two-building complex are used for order entry, posting shipping information, accounts receivable, inventory control and programming. Programming under way now includes payables, purchase orders and the firm's general ledger under the guidance of the

firm's two certified public accountants.

Software is designed to direct the operator through the information networks and selections of tasks he can perform. The operator logs on to the system by typing in his code. Different people in the firm have different security codes and are permitted to perform only certain functions.

As soon as the operator logs on, the CRT shows a parent screen listing all the authorized tasks by number. He then types a one- or two-digit number into the system and gets a subscreen, where the information is more

specific. The number for the specific task is the last to be typed.

As the operator works with the system, information on the CRT prompts the operator into making the correct entry. A continuing dialog between man and machine eliminates errors by checking every entry and step as it is performed, assuring the accuracy of responses before proceeding. When an order form is being generated, for example, the operator may make a mistake in the customer's account number. If the number is wrong, the system tells the operator why it rejected the entry and asks for a valid one.

GSI Terminal Microprogrammable

FOSTER CITY, Calif. — Gencom Systems, Inc. (GSI) has introduced a microprogrammable terminal system with data entry and word-processing capabilities.

Called the System 9000, the product line starts with the Model 9002, configured with a CRT, IBM Selectric-style keyboard and numeric pad, microprocessor and 6K bytes of dedicated memory. It is an editing subsystem for either data entry or text-processing applications.

Optional memory is available up to a total of 16K for user program applications. Also available is a second page with scrolling and page control feature.

An extended edit package and a programmer's interrogation module (PIM) for program development are other options.

System 9000 peripherals include a read-only printer and a dual floppy disk. With the addition of the dual floppy disk, System 9000 programs may be written, assembled and stored offline for later execution.

The Model 9002, manufactured for GSI by Zentec, Inc., costs \$2,950 from the firm at 1151 Triton Drive, 94404.

Tape Drives Run In Rugged Areas

PASADENA, Calif. — Data Electronics, Inc. (DEI) has announced three tape drives specifically designed for commercial systems that need reliability and high performance in rugged applications.

The Ansi/Ecma-compatible drives use the 3M DC300A cartridge with 1,600 bit/in. phase encoding and a transfer rate of 192 kbit/sec.

An integral, direct-current motor tachometer drives the cartridge directly.

Interface connections are bussed so that up to eight drives can be connected together (a miniature drive select switch is provided). A 3-bit address selects a drive while a 2-bit address selects a head track.

A variety of options are available: long-life heads (guaranteed to 3,000 hours), integral tape cleaner to enhance error rate performance, one or four tracks, 15 in./sec and 25 in./sec WRITE and bidirectional READ, 120 in./sec bidirectional SEARCH and REWIND and power supply.

Prices start at \$750, with interfaces priced separately, from the firm at 370 N. Halstead St., 91107.

Micro-Nova Renamed;

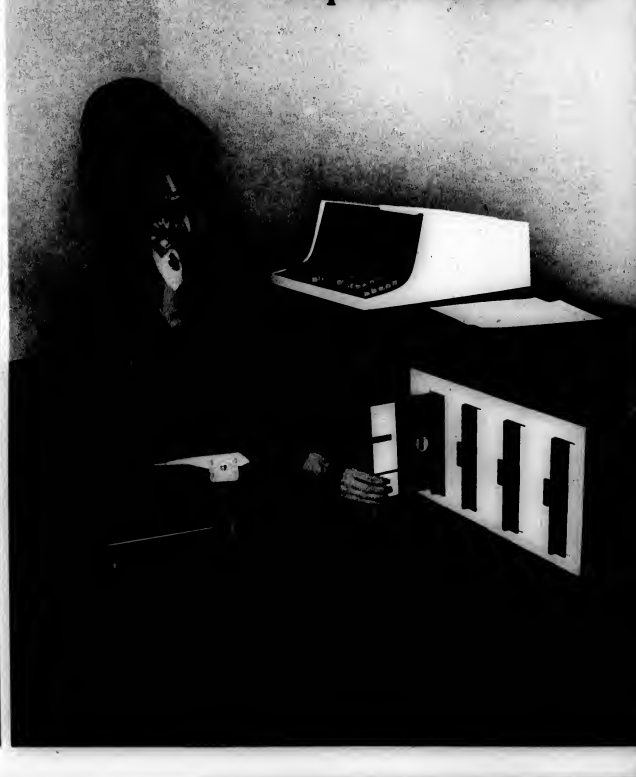
EDS Drops Price \$400

IRVINE, Calif. Educational Data Systems (EDS) has renamed its Micro-Nova to avoid a conflict with Data General Corp.

Now called the Micro-N, the device is a microprogrammable processor that occupies one slot in Data General's Nova or Digital Computer Control's D16 mini and is said to perform any microprogram process in parallel with those mini at higher speed.

EDS also dropped the price of the Micro-N by \$400 to \$2,600. Floating-point decimal arithmetic firmware that occupies 512 words of programmable read-only memory (PROM) sells for \$900 from the firm at 17981 Sky Park Circle, 92707.

The Datapoint Diskette 1100—



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- 11:30-12:45 Workshops Repeated
- 1:00-2:00 Luncheon
- 2:15-3:00 Wrap-Up Panel

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The '75 Caravan is coming to a city near you. Going your way is our way.

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Exposition and Forum: McCormick Place, On-The-Lake

St. Paul April 15-17 (Tues., Wed., Thurs.)
Exposition and Forum: St. Paul Civic Center, I.A. O'Shaughnessy Plaza.

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April 29-May 1
Exposition and Forum: Seattle Center, 305 Harrison Street.

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Exposition and Forum: Hyatt Regency San Francisco, 5 Embarcadero Center.

Please circle one number in each category below.
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- 22 Director/Manager/Supervisor/DP
- 23 Systems Manager/Systems Analyst
- 31 Manager/Supervisor/Programming
- 32 Programmer/Systems Analyst
- 41 Application Engineer
- 42 Other Engineering
- 51 Mfg. Sales Representative
- 52 Other Sales/Marketing
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- 90 Other

Bits & Pieces

Data Technology Plotters

Can Operate at Any Angle

WOBBURN, Mass. — The 3454 series of automatic drafting plotters from Data Technology, Inc. were designed to provide accuracy (± 0.004), resolution (± 0.025), and speed (up to 1,320 in./min) for medium- to high-volume plotting operation, according to the vendor.

The 3454 plotters "can be interfaced with any digital data source" and offer a standard plotting area of 34 in. by 54 in. The plotters may be operated horizontally, at an angle or in a vertical "picture frame" position to reduce space requirements, the vendor said.

Two high-torque stepping motors and a proprietary electronics package have replaced the complex mechanical linkages required on other flatbed plotter designs, the company added.

The 3454 line's direct drive system is said to be less expensive to manufacture and eliminates gear related errors and wearing problems.

The unit costs \$15,900 from the firm at 4 Gill St., 01801.

CFI Disk Packs Fit IBM 3330-11s

ANAHEIM, Calif. — IBM 3330 Model 11 users can substitute the 3336-11 disk packs from CFI Memories, Inc. for their mainframe's product, CFI said.

CFI also produces packs for the Model 1 drive.

The CFI 3336-11 disk packs cost \$925 from the firm at 305 Crescent Way, 92801.

Visidyne Reader Goes Outdoor

BURLINGTON, Mass. — The Voyager II from Visidyne Corp. is a portable microfiche reader that is said to be especially suited to outdoor applications.

The 7-in. by 9-1/2-in. screen reader weighs about six pounds and can be operated from an automobile cigarette lighter outlet. It is available with 20X, 24X, 32X and 42X lenses, the firm noted.

The Voyager II costs \$149 from the firm at 19 Third Ave., 01803.

Paper Shredder Feeds Itself

GLENVIEW, Ill. — The Model 44 paper shredder from Cummins-Allison Corp. can gobble a sheaf of printouts at once or feed itself from a stack one fold at a time, a company spokesman said.

The shredder's double-cut design can reduce output bulk to a single bag of shreds compared with five bags from competing shredders, the spokesman claimed.

The shredder costs \$2,995 from the firm at 800 Waukegan Rd., 60025.

A Look at Tape Drives — Part 4

Automated Tape Units Save Users' Cash

By Patrick Ward
of the CW Staff

DENVER — California Computer Products (Calcomp) Automated Tape Library (ATL) is a reliable performer despite its "Rube Goldberg nature," according to two early users.

The ATL contains a "robot" that works the length of the box-like tape library, putting tape reels on to arm mechanisms that do the actual motions and dismounts on the drives.

The device's core-resident software module occupies 32K and 38K respectively at the two sites, both with IBM CPUs.

The automated library also requires disk space to store its data base, which is basically an index of the files it contains. Although the ATL has its own Digital Equipment Corp. minicomputer, "it's strictly a slave to the code you have in your mainframe," one user said.

\$5,466/Mo Savings

An ATL has saved the Colorado National Bank \$5,466/mo in labor costs, CPU time, tape drive rental and reerun expenses, according to Alvin D. Reed, assistant vice-president and manager of computer operations at the bank.

The device has allowed the bank to reassign the equivalent of four workers

time, half of it in computer room help and the rest in tape library work, he said.

Reed puts the ATL's monthly costs at \$5,462. It leases at \$4,250/mo; it needs \$1,272/mo in computer time to operate; its management reports cost an additional \$350 in CPU time; and its paper costs add up to \$10.

With a previous approach, CPU wait time cost \$6,737, reerun time due to tape handling errors was \$157; labor time was \$2,774; label runtime was \$560 and label costs were \$50, for a total of \$10,278/mo, Reed said.

Since there is less idle time "while someone is looking for a tape or mounting a tape," the shop was able to cut down the number of its tape drives for a \$1,070/mo savings.

And because the ATL system has reduced an estimated 166 h/mo in computer wait time, "it's essentially given us another shift per day," Reed said.

The device has "definitely reduced tape damage from handling. I'd say on the average we were breaking two or three tapes a week due to the hustle and bustle of manual mounts," he said.

The bank's ATL currently has a 12-drive capacity and stores 2,250 reels, Reed mentioned. Its tape management software provides lists of where tapes are located and what tapes are up for retention and

scratching.

"If the hardware goes down, the software will tell you where a volume is and you go in and pull it out," Reed explained. "If you're going to do maintenance, you pull the volumes out in advance."

Reed put the ATL's uptime at 98%.

"We were heavily disk-oriented at one time," Reed recalled. "Our system design is now taking more advantage of tape due totally to greater confidence in tape handling."

Justified by Labor Savings

Keith Maurer, data systems supervisor for Mountain Bell, said his department justified its ATL "on the labor savings alone." It can do the work of six tape handlers, he said.

The shop's ATL contains about 3,050 reels and handles 16 Storage Technology Corp. 3420-equivalent tape drives which run with an IBM 370/158 system.

While he has not used a hardware monitor to compare performance before and after installation of the ATL, Maurer said "there's no doubt that it drives your system much harder."

Mountain Bell originally chose the ATL in part for the tape management system it offered. But, because of the shop's heavy testing load, "there was also need for something that would cause the tapes to be mounted readily without people running after them," Maurer explained.

The automated system has reduced tape-handling damage to "where it's almost nonexistent," he said.

Conversion to the automated system isn't done free, he said. Having previously used a tape management system made it easier, but "we did have to define our data sets in the data base," he said.

Although there were "quite a few problems of a mechanical nature" in the first month the system was in the shop, "downtime since then has been almost nil," Maurer said.

The Calcomp customer engineers have been quick to respond to a problem, the supervisor added, noting the ATL's mini-computer has been replaced about three or four times since ATL installation last summer.

"They don't fix them, they just plug a new one in and have it up in about 20 minutes," Maurer noted.

Both of the users mentioned they installed their ATLs before IBM's 3850 mass storage unit was available. Reed, however, said he plans to keep his ATL for the next several years.

As he sees it, the "3850 is a different concept. It would allow more files online when needed and also smaller files. It's more data-oriented," he said.

Reed, however, said the 3850 "is not going to replace tape for large sequential files."

Production Monitoring System Controls Foundry's Operations

WATERLOO, Iowa — The John Deere Tractor Works Foundry No. 2 runs with one of the nation's most complete computer-based foundry production planning and monitoring systems.

Devoted primarily to producing a high volume of castings, the new facility is serviced on a 24-hour basis by an IBM 1800 that has access to some 40 data reporting and recording stations.

Each day, the main Waterloo Tractor Works computer complex, with an IBM 370/155 and an IBM 370/145, produces a schedule for the next 72 hours of foundry production. Keyed to orders and the tractor works' production forecast, the foundry work schedule takes into account the lead times necessary to prepare the cores for the molding machine.

The 1800 keeps a perpetual record of casting and core production inventory status and activities within each department by means of 19 dispersed area data communications stations and 16 data entry units.

Reported are work activities performed by each of the 400 employees per shift and all core, core assembly and casting movements — the who, what and where

of foundry operations.

To facilitate computerization of the production and inventory control at the foundry, John Deere began an apprenticeship program in DP several years ago, involving younger personnel in a series of on-the-job learning and orientation programs.

The firm found a number of "bright" individuals from the foundry who had actually written foundry programs when they were in the systems development department. When they later returned to the foundry, they began looking for ways to increase productivity and efficiency by applying computer power. When the new foundry was being planned, many of the original design ideas involved utilization of computer power.

From Days to Hours

A primary design criterion for the new foundry was to slash the time lag between core assembly and casting, all the way from three to six days to four hours and under. To make such time savings possible required a complex scheduling and tracking system.

(Continued on Page 28)

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RAYTHEON

Automatic Tape Unit Saves Users' Cash

(Continued from Page 27)

The computer-generated molding schedule is broken down by component core assembly and core-making requirements. Perpetual reworking of the schedule each night factors in the previous day's production and determines how best to meet the changing business needs of the tractor works.

Rescheduling, in turn, relies on accurate reporting of the work in process and finished work at each of 40 workstations, 15 shifts per week.

The foundry master files or data base, then, consist of routing and engineering details covering some 500 cores and 100 different kinds of castings.

Establishes Priorities

The computer system prepares order evaluations and establishes the lot size and priority for each order scheduled. Lot sizes are determined by the break-even point between casting cost and set-up costs, accounting for expense in storage and movement.

Run sizes are determined by the economics of the foundry and inventory handling processes.

Considering scrap and storage factors, the computer also assigns priorities to the runs, insuring that the castings needed are

produced on time.

Data entered at the exit point from each major step in the foundry process is captured and stored by the 1800. Perpetual inventories and production status are maintained for all cores, core assemblies and castings. These records are transferred each night prior to the scheduling run for the following day to the 370s.

Each foundry employee knows what his day's work plan is by the specifications and routing information produced as by-products of the forecasting process. The printed records are held "in suspense" by the computer and,

when actual production and movement are reported, it enters what really happened, compares it against plan and adjusts the next day's schedule accordingly.

Inspectors update the computer's records by noting any castings scrapped as well as those passed and released for finishing.

Approved and inspected castings are retained in the finished casting inventory until a final transaction is entered. This is done when the casting is palletized and shipped to the factory. Scrapped castings reenter the melt process and data on them is reentered into the production scheduling loop.

BSI Adds Magnetic Tape Option

SUNNYVALE, Calif. — Basic Timesharing, Inc. has a magnetic tape option for its 4000 and 3000 series of interactive timesharing systems.

The magnetic tape option permits on-line dumping of disk files to magnetic tape and on-line loading of magnetic tape files to disk files.

Uses of the magnetic tape option include transfer of file data between a Basic Timesharing system and any other system using standard industry recording format and easy removal of inactive files from on-line disk storage to magnetic tape.

The magnetic tape option operates in industry-compatible, 9-channel format at both 800 bit/in. and 1,600 bit/in. density.

The magnetic tape option, consisting of a Model 4300 magnetic tape controller and Model 4350 magnetic tape unit, is priced at \$12,500. The firm is at 650 N. Mary Ave., 94086.

CDC 6400 Helps Ariz. Star Gazers Capture Details

TUCSON — With a computer-enhanced photographic technique three astronomers at the Kitt Peak National Observatory have produced the first pictures of a star that show some surface detail.

Previously, stars were too distant to distinguish anything but a pinpoint of light.

Roger Lynds, Jack Harvey and Peter Worden applied a technique known as "speckle" photography to photograph Betelgeuse, a red giant star almost as large as Earth's solar system. They took 40 pictures of the star through a telescope, exposing each plate for less than 1/100 of a second.

The short exposure divided the telescope's mirror into a number of smaller lenses, making not one image but many — from 100 to 500 for each picture, the researchers said.

Each of these speckles contained different information; to analyze and combine them, a high-speed scanning beam that can detect minute differences of light intensity was used to swap each speckle.

The data was then fed into a Control Data Corp. 6400 where Fourier transform processing was used to break up each signal and display it in terms of frequency. The speckles were then arranged into a composite photograph depicting a single stellar image.

The photograph of Betelgeuse was only 2 1/2 inches in diameter, but detailed enough to show faint markings which are believed to be hot spots in its atmosphere.

Lynds said the biggest problem with the system at present is that it's very expensive in terms of computer time. Processing each photo took about an hour.



All in a Day's Work for Multiprocessor

'Impartial' Party Assigns Moose Hunting Permits

QUEBEC CITY — Moose hunting here is so popular the provincial government's central service bureau uses a computer system to randomly assign 1,250 permits each spring.

"We have different quotas for hunters in the different parks and reserves of the province," according to Andre Gariepy, director of the service bureau, Centre de Traitement Electronique des Donnees (CTED). "Certain parks may permit only 200 moose hunters and

others as many as 1,000. We simply gave the job to the computer," a Univac 1106 multiprocessor.

The computerized drawing is open to the public, Gariepy said, so any interested person can see it's completely impartial. Officials of CTED and the Department of Tourism, Fish and Game are in attendance.

The provincial government uses a combination of departmentally operated computer centers plus CTED for its DP.

CTED's 1106 currently handles about 140 projects for 22 departments, using some 3,000 programs and printing as many as 50 million lines of information/no.

Minimum Disruption

CTED converted to the 1106 from two IBM 360/50 computers with a minimum disruption in service and productivity. The 1106 was installed in March 1973, and the bulk of the former programs were converted

by December 1973.

About 10 programmers plus 15 Univac specialists worked on the conversion of some 2,500 programs used by the previous computers.

The effort also entailed converting about 12,000 tape reels and retraining 200 DP staffers.

CTED's regular staff includes 45 systems analysts who design programs and write specifications and 40 programmers who write an average of 150 to 200 programs per month.

The 1106 includes a 265K memory and runs under the Exec 8 operating system. Records are kept on 10 Univac 8440 disk subsystems, one Univac 8440 disk subsystem and 22 Univac 16 magnetic tape units.

The computer usually handles about eight batch jobs simultaneously while serving 24 Uniscop 100 CRTs and a remote job entry network of seven terminals spread within the Quebec government.

"Ease of operation was a prime consideration in choosing the 1106 for such a large volume of work. We didn't want a complicated system where you need engineers to run computers," said Gariepy.

"We weighed the pros and cons and found the savings would make conversion worthwhile from a price/performance standpoint. We have easily doubled our capacity without disturbing our regular operation," he added.

"With our volume, we must get programs in and out of the computer without delay, otherwise we drown," Eddy St-Laurent, assistant comptroller, said.

CTED actually operates as a service center for the provincial government. The center belongs to the finance department, billing other departments according to the work which it handles.

The 1106 processes information from source documents which are picked up by truck each day from other departments in Quebec or mailed from more distant locations and then keypunched. The card data updates such records as payroll for civil servants, pensions and payments to widows.

Other jobs for the Tourism, Fish and Game Department include keeping statistics on the species and size of catches in the lakes and rivers of the provincial parks, controlling prices charged by innkeepers and landlords, supervising the quality of service, issuing operational permits and maintaining the index of hotels and restaurants.

For the agriculture department, the 1106 keeps statistics on results of artificial insemination of cattle, analyzing the quality and growth of descendants by breed of cattle. It also establishes reproductive capacity and quality standards for purbred pigs, provides schedules for optimum feeding of milk cattle, maintains data on agricultural production and oversees milk quality control for each producer.

Other applications include marriage and tourist surveys, statistics on land surveys, administering slum deposits, managing insurance policy records, calculating municipal debts and producing and maintaining the government telephone directory.

CTED also keeps records of products offered to the government by different suppliers and of government purchases.

CTED's programmers are organized into teams of about eight persons for specific jobs. When a programmer completes one phase of an assignment, this is recorded on the computer, which can thus show the exact status of each program and the time expended on each phase.

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Program to Rank Tennis Players May Eliminate Cries of 'Foul'

NEW YORK — Who's the nation's best tennis player — the consistent winner who beats almost everyone or the less steady player who conquers him in head-to-head matches?

Questions like this have confronted the ranking committee of the United States Lawn Tennis Association (USLTA) over the past 93 years. Early in 1976, though, a computer program will replace the committee in choosing the best players.

One reason for the change was the committee members' 1973 decision to corral Jimmy Connors and Stan Smith as No. 1. Neither player was happy with the result, which probably would have been different had the committee used a computer program, Leslie Jenkins, a member of the ranking committee, said.

"I think the real interest in the computer system is to develop a selection method involving as little human judg-

ment as possible," he commented.

Accordingly, the program replacing the committee is "strictly an averaging system that counts in a player's total record," he explained.

Jenkins, an atomic physicist who is also a competitive tennis player, wrote a Fortran program for an IBM 360/75 that produced a set of rankings for the USLTA committee came up with its 1974 list. He found the computerized rankings differed slightly, but not very significantly, from the committee's choices.

'A More Comprehensive View'

The ranking program can take a more comprehensive view than the committee could, in Jenkins' opinion.

An algorithm calculates the total number of points players earn by advancing to certain rounds in particular tournaments and then divides the total by the number of tournaments entered.

A second part of the algorithm adds up the average tournament points of all the opponents a player has beaten during the year, then divides it by the number of matches he's played.

Players seem to like the idea of the computerized system's approach. Its goal is to serve them better, Jenkins said.

The USLTA may also use the ranking program to produce monthly, rather than yearly, rankings. These would help tournament directors in deciding how to seed players in tournaments during the course of the year, he noted.

Researchers Seeking Funds to Automate Sports Injury Data

STATE COLLEGE, Pa. — Pennsylvania State University researchers are collecting a data base on sports injuries, hoping one day to predict how injury rates can be reduced.

So far, the nonprofit National Athletic Injury/Illness Reporting System (Nairs) has been operating without the help of a computer, "eyeballing" data from 15 college and 18 high school teams. Dr. Kenneth S. Clarke, director of the program, said.

Nairs, however, has applied to both the Consumer Product Safety Commission and sporting goods manufacturers for the money to enlarge and computerize its research.

Computer processing, Clarke said, would allow the research group to send periodic statistical and analytical reports back to those who assist us by filling out injury and illness forms.

Currently, high school and college athletic trainers who participate in such studies "see the results in print in three years, if they catch the right journals," he stated.

Nairs hopes to involve hundreds of colleges and high schools in its research, Clarke said. Their help would enable the service to establish the precise effect various rules changes have on sports injuries, he added.

The system might also answer what kind of playing surface and football shoes produce the most knee injuries, the most hockey injuries occur and whether suspension helmets or padded helmets are better at preventing head injuries.

"If the Penn State program can get enough people participating, we'd be glad to rely on that system to make our decisions," Dave Nelson, secretary of the National College Athletic Association's Football Rules Committee, said. "I think it will work," he added.

If the computerized program reaches maturity, Clarke said it should be able to provide schools and colleges with a statistical injury reporting service for as little as \$50/year.

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High-Speed Simulation Unveiling Stellar Secrets

PASADENA, Calif. — The secrets of "nuclear cooking" in giant red stars are being uncovered by a Caltech-Jet Propulsion Laboratory (JPL) scientist here using high-speed computer techniques.

Deep in these giant stars, helium burns violently, erupting in flashes astronomers have studied with increasing interest. With the computer system, Dr. Juliana Christy-Sackmann, Caltech astrophysicist, has been simulating the chemical changes that occur with each flash at a pace 500 times faster than previously possible.

To obtain what might be called "star profiles," Christy-Sackmann transmits data on each star flash to a Control Data Corp. 7600 located at the Uni-

versity of California's Lawrence Radiation Laboratory, Berkeley.

The CPU analyzes each flash in less than five minutes — "a saving of 500 times, both in time and money, over previous methods," the researcher claimed.

Of the hundreds of successive flashes taking place in a star, previous investigators found it possible to follow and analyze only a few because of the long computation time involved, she said. Having looked at 40 flashes during the first year of research,

Christy-Sackmann plans eventually to study hundreds of these chemical changes.

Role of Helium and Hydrogen

Sponsored by the National Aeronautics and Space Administration (Nasa), Christy-Sackmann's work currently stresses the role convection of helium and hydrogen gases play in fueling the stellar fires.

While each red star flash may produce extreme interior disruption, surface changes in most

cases appear to be comparatively minor, the researcher commented. The release of energy from the interior varies enormously, perhaps due to "convective zones that seem to come and go," she added.

Christy-Sackmann hopes the project will reveal the nature of the apparent connection between the interior cooking regions of stars and their observable surfaces. The study eventually may help to solve the problem of how stars evolve, she

said. Whatever the flash mechanism, the stellar furnace yields many elements, the researcher added. Atoms of light elements like lithium and of heavy metals like zirconium and yttrium have been found in red stars.

She agrees with other researchers, however, that lithium, the lightest metal known, could ultimately provide the best clue to the interior structure and convective mixing that goes on in giant stars.

Recycled Checks Often Rejected, Banker Warns

PITTSBURGH, Pa. — Rising costs of paper, ink and labor are causing some printers to sacrifice quality in check printing, much to the detriment of automatic check processing systems.

That warning was issued by George P. Di Nardo, vice-president of the Mellon Bank, here, and chairman of the American Bankers Association's Operations/Automation Communications, Research and Planning Committee.

Di Nardo reported seven banks have found use of recycled paper and production shortcuts have vastly increased the reject rate of checks processed automatically.

Checks printed on recycled paper, according to Di Nardo, are often not readable by machine. In addition, the poor tensile quality of recycled paper causes transport problems, he claimed.

"When you consider that each check goes through an average of 2 to 3 banks, alternate processing methods are going to cost a lot more than the cost of remaking the inferior checks," he said. The Banking Administration Institute is conducting a study of the problem and is expected to issue some recommendations shortly. In the meantime, however, Di Nardo urged banks to assure quality control by checking samples in quantity of each check and form manufactured by an outside printer. The samples should be tested on the bank's automated equipment prior to shipment to the customer.

A proposal to certify printers as even been offered as a possible solution to the problem.

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Federal Agency Testing Automated Car Diagnosis

How helpful are those automated tests that diagnose a car's problems with electronic equipment? Are they better than a good mechanic? Can they save money?

These are some of the questions the U.S. Department of Transportation expects to answer through a pilot demonstration program just launched by the National Highway Safety Transportation Administration (NHSTA).

The program calls for an analysis of car defects and associated repair costs, using data collected by state-operated inspection stations and interviews with as many as 75,000 car drivers. Up to 300 items of information will be collected on each car.

"This is a consumer program," Dr. Leslie Eder, NHSTA's project manager, said. "Our purpose is to determine the costs and benefits of a diagnostic inspection program to the consumer, when inspections are made without any connection to the operation of a repair facility."

NHSTA will conduct the demonstration project through grants to Alabama, Tennessee, Puerto Rico and the District of Columbia. A fifth grant is under discussion with Arizona, Eder said.

Specially Equipped Stations

Drivers participating in the project will receive automobile safety inspections at specially equipped diagnostic inspection stations. The intensified check will be incorporated into the regular car inspections drivers in most states must put their car through yearly for certification. Each item checked will be entered into a time-shared computer system and a printout made of the car's condition.

Approximately half of the drivers passing through the inspection centers will comprise a "treatment group." They will receive a detailed report on vehicle

defects spotted by the electronic diagnostic system.

The balance of the drivers, known as the "control group," will only be told their car failed the inspection and needs repairs.

Follow-up interviews will be conducted with all of the drivers when they return to the center for reinspection of their cars. They will be asked how much repairs cost, what defects their mechanics found and related information. This, too, will be entered into the computer system. By analyzing all of this data, NHSTA will be able to compare the adequacy of the electronic inspection system with the diagnoses of trained mechanics. Maintenance and repair costs of the automobiles, the most common types of safety defects and the effectiveness of various types of electronic analyzing equipment will also be evaluated.

NHSTA will use Computer Sciences Corp.'s Infonet network to store and analyze the data, which will be gathered over an 18-month period. The company's \$712,000 contract with NHSTA calls for a final report to the agency in about 30 months.

Overcoming Two Problems

The government expects the project to overcome two of the most difficult problems involved in an evaluation of the benefits that might be realized from expanded use of automated inspection systems.

The first problem is how to get accurate information on costs and repair work in such a large-scale operation. Follow-up interviews take care of that. The second problem is the lack of comparative information about the performance of the many types of diagnostic equipment, their design and ease of use and the training of personnel to operate them. This knowledge gap will be filled by on-the-spot evaluations at the inspection centers, as well as comparative analysis of the information collected.

The program will also examine the numbers and types of cars rejected by diagnostic inspections.

In addition, information from the program may help to show whether the design of a vehicle aids or hinders the inspection and repair of particular makes of automobiles, Eder said.

Data collected from interviews and the automated inspection centers may also serve as the basis for predictions on the life expectancy of mechanical parts. The study will determine which types of mechanical failures are likely to occur in each type of car examined and at what point in the life of the car these failures are likely to appear.


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CI Notes

1974 DP Balance of Trade Hits Record \$1.98 Billion

WASHINGTON, D.C. — The computer and business equipment industry's positive balance of trade hit a record \$1.98 billion in 1974, running counter to the increasingly negative overall balance of payments.

This compares with \$1.401 billion in 1973, according to figures compiled by the Computer and Business Equipment Manufacturers Association (Cbema) from U.S. Department of Commerce data.

Exports of computer and business equipment during 1974 totaled \$3.01 billion compared with \$2.32 billion last year. Imports also grew, to \$1.03 billion from \$919 million a year ago.

The national trade balance for 1974 was a negative \$3.1 billion compared with a positive \$1.3 billion last year.

During the fourth quarter, industry exports totaled \$808.7 million while imports were \$284.4 million, for a positive contribution of \$524.3 million.

Adapto to Conserve in Mexico

MONTVALE, N.J. — Mexico City is the site and the future of the computer services industry is the theme for the upcoming 42nd management conference sponsored by the Association of Data Processing Service Organizations, Inc. (Adapso).

Scheduled for April 14-18, the conference will focus on government regulation, unfair competition, industry image building, industry standards, taxation and the industry structure in five, 10 and 15 years.

Travel, hotel and registration is being handled by Travel Consultants, Inc., 1025 Connecticut Ave. N.W., Washington, D.C. 20036.

DG to Close Canadian Plant

HULL, Quebec — Data General Corp. (DGC) is closing its Canadian assembly operations here and moving the work to Southboro, Mass. because of high overhead costs and scheduling problems, the firm said.

The plant which manufactures back panels and some circuitry for power supplies, employs about 45 people.

DG will maintain its sales and service operations here.

Supershorts

Wangco, Inc. has received a contract from Univac for Model U-1200 tape drives valued between \$6 million and \$7 million.

Telex International will market, install and maintain Fabritek memories in France, Germany, Italy, Switzerland, Belgium and the U.K.

Delays Invite Speculation

Will U.S., IBM Settle Before Court Date?

By E. Drake Lundell Jr.

Of the CW staff

NEW YORK — The new delays that have set back the trial date in the government's antitrust action against IBM (CW, Feb. 26) have led to a great deal of speculation that the parties may be negotiating an out-of-court settlement.

Both parties deny emphatically that such negotiations are taking place and have promised to inform the judge hearing the case if they do, in fact, start to negotiate. And he, in turn, has indicated the public will be informed early of any negotiations.

While many may discount the denials by both sides in the case, it appears there is little reason for either side to currently want to settle the action.

To feel that there will be a settlement, think it would be to IBM's advantage to settle the case so the firm will not be faced with subsequent suits from users and firms in the industry in case it loses the government action.

These sources point out that a government victory could be used by others as prima facie evidence that IBM was guilty of monopolization, therefore making subsequent antitrust cases easier — and less expensive — to bring against the firm.

To accept this view, however, would mean that one would have to believe IBM feels it is guilty and runs a great risk of future cases.

Not the case

Clearly, from all public statements from the firm and its lawyers, this is not the case. IBM — and its legal army — appears to be extremely confident it can win.

Psychologically, then, IBM knows it has a good case and a good chance of winning and clearing its name in court. Balanced against this is only the worry that, if it loses, it could be faced with massive, subsequent actions.

And even this worry could be much smaller than many in the industry have indicated, since few firms have been seriously hurt by follow-up actions after losing cases to the government — after all, Alcoa and Standard Oil still seem to be doing pretty well, even though they were both losers.

Potential Political Dynamic

On the government side, there is probably less reason to want to settle than on the IBM side, even though the cost and manpower needed to prepare and try such a large case could be factors producing a government's drift in this direction.

Since IBM won the latest round in the U.S. action and since it feels confident it can win a government case, the firm would obviously not be willing to offer the government much relief through a consent decree.

And without a great deal of concessions from IBM, any settlement agreed to by

the government would come under a tremendous amount of political fire — which an administration that has pledged to use the antitrust laws vigorously would find hard to take.

With the passage late year of the Tunney bill, which opened up consent negotiation to public scrutiny, the days when the government and a private party, hidden from public view, could quietly negotiate

it is therefore clear no decree could be negotiated in today's political and industry climate without a great deal of hue and cry from both the politicians and the industry — and, with a large number of politicians already off and running for the 1976 elections, the results could be politically undesirable for the Ford administration.

Furthermore, the government also feels it has a solid legal case against IBM, even if it does know the action is slowing new legal ground. For this reason alone the Justice Department plans assigned to the case — and, so far, their superior also — are anxious to pursue the matter to see if their interpretation of the law will be upheld.

The Justice Department has been under a great deal of fire for its action in the Watergate affair and in handling other antitrust matters such as the ITT case. A settlement now with IBM would further damage the reputation of the department.

All of the reasons available today, therefore, indicate the case will go on — if the government can ever dig itself out of its massive paperwork burden.

Analysis

a consent decree are gone. Now every action taken in such negotiations will be open to comment and the government will have to explain its actions.

Trustbusters on Capitol Hill are becoming more and more vocal all the time and most of them are centered in the Democratic party. In addition, industry organizations — such as the Computer Industry Association — would be sure to howl at any weak decree that the parties might try to negotiate.

Industrial Micro Sales to Reach \$887 Million by '83, Study Says

By Nancy French

Of the CW staff

Industrial microcomputer sales will increase to \$887 million in 1983, nearly 50 times the \$18.2 million in sales charted in 1974, a recent Frost & Sullivan, Inc. study predicted.

Dividing microcomputers into four categories representing the principal components of the microcomputer market — I/O interface equipment, microprocessors, microcomputer add-on memory and microcomputer programming — the report forecast significant increases for each.

The highest growth for any product category is expected in sales of I/O interface equipment for industrial applications, with sales projected to increase from \$3.8 million in 1974 to \$225 million in 1983, the report said.

For microprocessors, sales should rise from the \$8.1 million reached in 1974 to \$406 million in 1983.

The microcomputer add-on memory market is expected to jump from \$5 million in 1974 to \$221 million in 1983. Within this total, read/write memory elements will overtake read-only elements within four years, the report said.

Microcomputer programs are generally implemented using Assembly language processors. Cross-assemblers and other program development support will continue to be provided by the manufac-

turers, Frost and Sullivan said without quantifying this category.

The industrial market total for microcomputer-based and microcomputer-based systems show the microcomputer dollar volume surpassing that of the mini after 1982.

As is currently shown by the low-end "minicomputer-on-a-card," the distinction between these two classes will continue to blur, the report predicted.

Five Market Groups

The report divided the market into five principal groups: manufacturing industries, process industries, mining, electric and gas utilities and foreign industrial sales.

The greatest volume of growth will occur in foreign industrial sales, with this market share predicted to jump from 14.2% in 1974 to 30.4% in 1983. In dollars, foreign sales will go from \$700 million in 1973 to \$270 million in 1983.

Japanese and West European markets for the industrial application of microcomputers are expected to reflect distribution patterns similar to the U.S. domestic market in terms of principal end users. Their use of microcomputerized methods is expected to lag behind the U.S. by 2 to 3 years early in the decade, but should be essentially on-

(Continued on Page 34)

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A special report on hardware options that can save you money - in the March 26th issue of *Computerworld*.

In this special supplement to *Computerworld*, edited by Vic Farmer, we'll be taking a look at different ways users have maximized performance and saved money at their installations through hardware options - including used computers, multiple vendors, and various leasing arrangements, to name a few. The risks involved in these options are an important part of this special *Computerworld* report, and we'll analyze them in detail. You'll see articles like these:

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Three-Pronged Service Strategy Helps DRI Customers Forecast

By Patrick Ward
and Edith Holmes
of the CW staff

LExINGTON, Mass. - Data Resources, Inc. (DRI) specializes in providing economic models of the U.S. and foreign economies to customer firms for financial planning and forecasting.

In addition, DRI provides consultants to help individual customers determine what the general forecast means to them.

Users who build their own models can tie their industry into DRI's continuously updated national models, President Otto Eckstein noted.

Eckstein, a Harvard economics professor and a former member of the President's Council of Economic Advisors, is himself one part of DRI's three-pronged service to customers, said Fred Bamber, group manager of the company's Boston and Pittsburgh consultants.

Economy Always Changing

Since the economy is always changing, customers need continuous problem solving and should have some internal capability to help themselves, Bamber said, so the third part of DRI's service allows the

customers time-sharing access to "our bag of tricks... the software and the set of tools to do what we do," he said.

"Most of our customers employ all three," Bamber said. "For example, the Council of Economic Advisors wants to hear Eckstein, yet it also wants to plug its own numbers and assumptions into DRI's models."

"So the Council calls in a DRI consultant who is the interface between our machines and the time-sharing system. Consultants and the time-sharing system fulfill users' microeconomic needs, according to Bamber, while Eckstein and DRI's monthly hard-copy report, "The Data Resources Review," provide customers with the macroeconomic view, according to Bamber.

DRI provides its time-sharing customers local access through a small number of limited in-Wats lines and leased lines to concentrators or multiplexers in Washington, Toronto, New York, Pittsburgh, Chicago and Hartford.

The company also uses the Tymnet digital network with service to 80 other cities. Customers in Brussels, Paris and London come in through the Tymshare network. There are no differential rates except for calls from Europe, John L. Lauer, DRI vice-president, said.

DRI Equipment

The DRI data center currently includes a 2.5M byte Burroughs 6700 with two CPUs, two I/O processors and two communications processors. There is also a 6M byte Burroughs 7700 with a similar configuration.

DRI plans to convert to a four-CPU 7700 this summer.

Eckstein said DRI chose Burroughs because it's work is not oriented to number-crunching, but to mixing some calculations with lots of data. DRI first selected Burroughs because of the Master Control Program (MCP) on the 5500.

Micro Sales to Hit \$887 Million by '83

(Continued from Page 33)

current by the early 1980s.

Sales to the manufacturing industries are expected to rise from \$5.2 million in 1974 to \$236 million in 1983. While sales will increase in dollar volume, they will decrease sharply in percentage, with the 1974 market share of 55% dropping to 26.6% in 1983, behind foreign industrial sales and the process industries.

Within manufacturing, the report indicated transportation equipment manufacturers will be the largest users with fabricated metals, a major OEM for microcomputers.

The process industries, almost exclusively end users of microcomputers, are next, with 23.1% of the market in 1974. By 1983, they will be the second largest market segment, with 29.5% of microcomputer purchases, grossing \$261.0 million, compared with \$4.2 million in 1974.

Micros will be sold to the process industries principally through instrumentation manufacturers (fabricated metals), according to Frost & Sullivan.

The chemicals category is anticipated to be the largest individual process manufacturing industrial user by 1983, when even the smaller chemical producers will be able to justify and deploy them.

The highest growth rate, however, will be in the other process industries, including pulp and paper, rubber and plastics, glass and ceramics, cement and textiles. The mining industry is expected to increase its usage from an almost negligible \$200,000 in 1974 to a respectable \$32 million in 1983. The industry's current emphasis on plant expansion, coupled with the demand for mined raw materials, will contribute to this upsurge.

Another Approach to Professional Development

Oil Company Becomes Vendor of DP Training Courses

HOUSTON, Texas — Forms Analysis and Design, Time-Sharing Option Basic and Cobol, IMS Concepts, Transition to Data Base, Programming and Data Base Design. Take your pick — but not from a catalog detailing the course offerings of a company dedicated to DP education.

These and other DP training courses have been developed internally over the last seven years by Shell Oil Co.'s Information Systems Department and first became available to the public last summer. "Why has Shell become a vendor of DP courses?" "The oil companies are in the midst of a changing environment; the last few months have forced us to think about alternative means of maintaining a viable organization," said T.R. Young, Manager of training with the Information Systems Department.

"We are pursuing a profit, but revenues from this product line won't be anything to cause Wall Street to take notice," he added. "Within this department, we are concerned about the variable quality of DP training available in the commercial market."

Course Offerings

Shell's courses deal with programming, hardware/systems, data management and applications. In addition, introductory classes are offered in subjects such as Critical Path Method/Program Evaluation Review Technique (CPM/PERT), experimental design, linear programming, regression analysis and terminal-oriented systems design. Shell includes all but about six of its internally developed programs in its listing of 26 commercially available classes.

Since July, these courses have been attended by employees of such diverse organizations as Walter Reed Hospital, NCR, Blue Cross of Virginia, Tennessee Life Insurance Co., the University of Texas Medical Branch, Mobil Oil, Tenneco and Pennzoil, Young noted.

"Forms Analysis and Design" was the first course where we secured full attendance," he said. He added that several attendees commented they had had difficulty finding courses similar to those offered by the oil company in TSO, IMS and MAR IV.

Providing courses not generally available is one factor that distinguishes Shell from other DP education vendors, Young said.

In addition, since all courses have been developed to meet the needs of the company's development people," we hear about it immediately if there is anything inadequate about them," he added.

SEC Investigating CA For Stock Violations

IRVINE, Calif. — Computer Automation, Inc. (CA) is under order informal investigation by the Los Angeles Regional Office of the Securities and Exchange Commission (SEC) for possible violations of the Securities Exchange Act of 1934, according to a recent announcement from CA President David H. Methvin.

While Methvin said he believes no violations have occurred, a source attributed the investigation to claims company officials traded substantial amounts of stock immediately prior to a recent major layoff.

Methvin said extensive inquiries of company officers and directors are being conducted, although no formal order has been issued by the SEC and no specific charges against the company or its officers and directors have been made.

The SEC official making the investigation would say only that such investigations are not made public until the commission decides to take some action on the basis of the information uncovered.

Finally, he noted Shell spends an extensive amount of course time in workshop exercises, using keyboard terminals. "While our courses tend to be 20% longer than others as a result of this emphasis on hands-on experience, we feel we leave more students with a workable skill."

Limited to 12 people, terminal workshops provide one terminal for every two students. For nonterminal courses such as Cobol or JCL, a maximum of 20 students is allowed, Young said.

Students are trained on Shell's IBM 370/168s, Univac 11/04 and Univac 1108s, but none of these machines are dedicated to training alone.

Most of the courses offered are conducted with lectures and accompanying workshops, Young noted, but the company is investigating other means of training. "We've been using a video training

studio moderately for five years, he said. Soon we will be adding color to its black-and-white facilities."

In addition, the training department has used IBM's Interactive Training System (ITS) and Computer-Assisted Instruction (CAI) for the last year, according to Young. He said the department has also recently acquired a trainer specialized in this area.

"We could probably get by with ITS, CAI and video packages alone," Young commented. "Certainly, Shell would save money that way as we currently spend \$66 to \$70 per student per day. Electronic media would reduce our costs to \$3 for each student each day."

But the training department prefers to maintain a close student-teacher contact, he said. "And I have yet to meet a media trainer who has measured the effective-

ness of his training."

He indicated Shell will add project management, IBM 3270 screen formatting and design and Ramis to its list of offerings this year.

In The Black

Young noted, at rates of \$90/student-day, the program of outside course offerings was in the black 30 days after it began operation. "We simply used two direct-mail solicitations to large companies to gain our present clientele," he said.

Where the oil company will go from here with its outside training program, Young doesn't know. Will Shell begin to spin off its DP training after the fashion of the aerospace companies five years ago? "Your guess is as good as mine," he said.

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In Face of 'Flatter Business'

Wangco Expanding Tape, Disk Drive Product Lines

By Molly Upton
Of the CW Staff

LOS ANGELES — Although business is "flatter than it was," Wangco, Inc., maker of tape and disk drives for minicomputers, is moving ahead with a barrage of new products.

George Toor, vice-president of marketing and one of the firm's founders, said he expects business to resume once inventories have been reduced. Some customers are stretching out orders, although some have increased their demands, he said.

In addition to its line of OEM tape and disk products, Wangco is developing specialized products, which generally incorporate a great number of standard product components, he noted.

This new effort has been in response to specific demands, he said, rather than trying to compensate for the increasing

trend among minimakers to vertically integrate their operations.

The Brightest Star

Perhaps the brightest star among its new products is the Series N/32 nonreplaceable moving-head disk, which has the "happy coincidence" of having the same capacity as the disk used in IBM's System/32.

It is self-contained, and Toor sees this meeting the demands of other mainframers deciding to bring out a product competing with the System/32.

Wangco also is looking at doubling the capacity of its standard line of disk drives. This would result in a 20M byte capacity with a replaceable cartridge offering double data density, retaining 200 track/in, Toor said.

In the tape area, Wangco may bring out a 125 in./sec unit before the end of the

year. This product will have the same automatic cartridge-threading feature as its Model 12.

A Conservative Design

Among the features being planned are a conservative design, which Toor explained means a low power consumption, easy adaptability and good reliability. Although these criteria tend to dictate a larger unit, the size of the tape box is not a critical factor, he said.

Cipher Orders Picking Up Again

By a CW Staff Writer

SAN DIEGO — Cipher Data Products' revenues should grow between 20% and 25% during 1975, compared with 75% in 1974, said Robert K. Holst, western regional marketing manager.

Toor said it is difficult to assess what effect minicomputer's vertical integration schemes have had on the miniperipherals business, since this action generally coincided with the downturn in the economy.

The floppy disk is a "logical kind of product" for Wangco, but not now, he said, adding that, if Wangco decides to enter the field, it will be when the volume of orders is greater and the number of competitors fewer.

Increasing orders for Cipher's tape drives held up fairly well until about November, when customers started extensions, he said. However, western customers are suddenly placing sizable orders again, he added.

Cipher, an OEM supplier of both incremental and continuous tape drives as well as cassette decks, is now marketing an add-on 16K memory compatible with Digital Equipment Corp. PDP-11s.

The unit is made by parent company Computer Machinery Corp. (CMC) for its own consumption in its key-to-disk systems, and Cipher will market it, initially on an OEM basis.

Being related to CMC benefits Cipher because many OEM customers appreciate the fast service supplied by CMC, he said. CMC orders account for no more than 20% of Cipher sales, Holst estimated.

Other Markets

Other major markets are other key-to-disk makers, systems houses and military applications. The firm is pursuing the telephone industry as a specialized market. Certain modifications in equipment need to be made for central office switching equipment, but much of the basic tape drive is used, he said.

Holst hasn't noticed that minimakers' vertical integration, or being perceived as manufacturer in-house, has affected Cipher, but he did observe the larger tape-drive makers have been "selectively seeking accounts in order to squeeze out the little guy."

This may be a result of larger firms trying harder to maintain volume in the face of stretched-out deliveries, he suggested.

The foreign market for cassette drives is expected to increase dramatically, while the U.S. picture looks more stable, he said.

In order to be prepared for projections that the floppy disk will replace the cassette, and because the market estimates are so large, Cipher plans to introduce a floppy disk drive in May, probably at the National Computer Conference, he said.

New Registrations

ELECTRONIC DATA SYSTEMS CORP. (EDS), 1300 EDS Center, Dallas, Texas 75235, has filed to register 100,000 shares of common for the Qualified Stock Option Plan. No underwriter is involved.

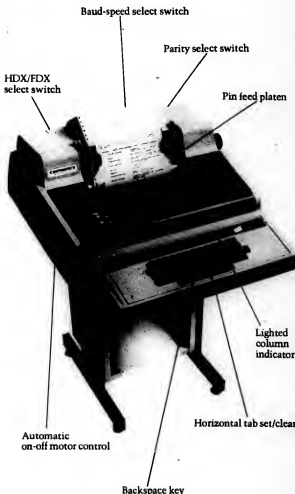
BRADFORD COMPUTER & SYSTEMS, INC., 1700 Broadway, New York, N.Y. 10019, a computer-based clerical service firm, has filed to register 242,875 shares of common in connection with a merger between a wholly-owned subsidiary of the firm and Centare Corp. In which 0.2346 Bradford shares will be issued for each issued and outstanding share of Centare common. No underwriter is involved.

THE FOXBORO CO., 31 Neponset Ave., Foxboro, Mass. 02035, a manufacturer and distributor of instrumentation and systems for process management, has filed to register 211,790 shares of common to stockholders of Trans-Sonics, Inc. upon consummation of the proposed acquisition and liquidation of Trans-Sonics, Inc. No underwriter is involved.

DIGITAL EQUIPMENT CORP., 146 Main St., Maynard, Mass. 02174, a digital computer firm, has filed to register 21,913 shares of common. No underwriter is involved.

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IBM Shows Microprogrammable Units for Military

By E. Drake Lundell Jr.
Of the CW staff

WASHINGTON, D.C. — Although defense business accounts for only 3% of IBM's total revenues, it is not ignoring that market, as two recent product introductions show.

At the recently concluded Navy League Show here, the firm conducted the first public showing of its System/4 PL ML-1

general-purpose aerospace computer along with a new Advance Signal Processor (ASP) unit destined for shipboard and aerospace applications.

Each unit is microprogrammable, a feature that is being pushed in the military market by IBM despite its reluctance to permit user microprogramming in its commercial systems.

The newest member of the System/4 PL

family uses large-scale integration throughout for a 28-b unit that contains 32K words of main memory and a "performance capability in excess of 400,000 operations per second," according to IBM.

The unit, the firm added, is "adaptable to a wide variety of applications such as guidance and navigation weapons delivery, digital flight control and communications."

Choice of Memories

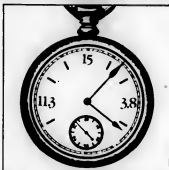
The organization of the unit permits the choice of floating-point, cordic algorithms, core or monolithic memory and various microprogram instructions sets and communications options, the firm added.

The unit has an asynchronous memory interface said to permit the use of new storage developments without changing the logic, and it features a repertoire of 108 instructions.

The APS is said to be capable of signal processing throughput of 10M to 20M multiply/sec and is expandable to 40M; and provides a direct memory access I/O rate of 196K word/sec/channel with eight input and eight output channels available.

The unit will be used for multisensor signal processing, according to IBM, which also refers to it as a signal analyzer.

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Has Tailored Program

DP Firm Serves Entertainers' Needs

By Catherine Arant

Of the CW staff
SOUTHFIELD, Mich. — Traditionally, the closest a rock band ever gets to automation is a Moog synthesizer. But Entertainment Data Systems is attempting to alter that situation with a computerized accounting system aimed specifically at entertainers.

The company was born last summer when Tom Connor, a band manager, and Chic Young, his accountant, worked out a computer program for musicians that would assure them an ongoing method of tracking expenses, income and profits on a regular basis.

Young had already developed a similar program for doctors; Connor suggested designing a more specialized one for the music business.

Written in BAL and RPG and run on a Cascade Data computer, the program uses a customized language peculiar to show business. Words such as "fig," "drumstick" and "strings" (job, stick for playing drums and guitar strings, respectively) make the program easy for musicians to apply to their needs.

Only Program of Its Kind

This is the only program of its kind, Connor claimed, adding it brings needed order to a business which tends to "have everything in a shopping bag" when it comes to keeping financial records.

"Show business is traditionally handled on a cash-and-carry basis, which makes for really sloppy accounting. Entertainers usually find it a pain in the neck to do their books," he said. With Entertainment Data's system, the client assigns an account number to each check he writes and fills out an expense form. He receives a detailed profit and loss statement monthly and may request monitoring of any special items he wishes.

The program is especially valuable as a tool to predict all expenses and overhead against income, enabling the client to be aware of the profit possible from

any job, said Connor.

"If the band earns \$1,500 per week gross, with a previous history profile we can figure the average replacement costs of drumsticks, truck rental, food and so on. Pretty soon you come up with a 39% expense figure that you have to write off the top. Then you know it will be profitable.

The firm also handles concerts and to far has one concert agency and four bands as its clients. Connor feels that the company's greatest potential is serving large touring bands such as Led Zeppelin and Alvin Cooper.

Contracts

Codex Corp. has signed a three-year contract with the German telecommunications manufacturer, Tekade-FGF GmbH, to supply data communications products valued at more than \$7 million.

The Hughes Aircraft Co. Ground Systems Group has received a contract addition from the Naval Sea Systems Command to supply data display consoles for ships of the U.S. Navy.

Systematics, Inc. has signed a long-term contract with First Michigan Bank and Trust Co. for operation and management of a central DP facility.

Logicon, Inc. has been awarded a contracts upgrade with the U.S. Navy Electronic Systems Engineering Center for development of a mobile data link communications test and training system.

Compusan, Inc. has been awarded a \$6.2 million contract to furnish Crosfield Electronics with background processing and input terminals over a three-year period.

Varian Data Machines has received a contract order to supply Autotek with 59 Varian 620L computers for use in its automated drafting systems.

Computer Sciences Corp. has been awarded a one-year, \$400,000 supply contract for implementation of the U.S. Air Force's 173 programming language.

Advanced Electronics Design, Inc. has begun shipment of AED 2500 floppy disk systems under a \$250,000 contract award from Stromberg Datagraph, Inc. for use in its System 4500 COM recorder.

Computer Network Corp. has been awarded a production and development contract from the U.S. Department of Health, Education and Welfare for data processing for the Guaranteed Student Loan Program.

Diatronics Corp. has signed DP service contracts with Joseph A. Hendel, Inc., and Burns Bros. Manufacturing, Inc.

Western Union Banking Systems has been awarded two contracts totaling more than \$1.7 million by The Chase Manhattan Bank for DP and communications-oriented systems to automate and monitor the bank's money transfer functions.

The Midwest Stock Exchange Service Corp. has signed a long-term service contract with International Time-sharing Corp. to market time-sharing services and provide customer support.

University Computing Co. has signed a five-year contract with the National Bank of Tulsa to provide data processing for the bank's operation.

Electronic Data Preparation Corp., a subsidiary of Anacom, Inc., has renewed and expanded a contract with the Indiana Department of Revenue for operation of the department's DP center for the next three years.

Position Announcements

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\$1,206-\$1,543

General duties: Work with management to determine new software and hardware requirements. Has primary responsibility for program maintenance and development and technical support of computer systems and related software. Minimum qualifications: One year experience as a Systems Programmer 11, or equivalent. In addition, applicants must meet the following SELECTIVE CERTIFICATION: experience in both using and maintaining Burroughs B6700 operating system software, i.e. COMOL, compiler and current data management software (DBMS-11). Final exam will be oral review board.

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Memorex Loses \$8.97 Million in '74

SANTA CLARA, Calif. - Despite 1974 revenues of \$217.6 million, a full 23% ahead of 1973, Memorex reported a year-end loss of \$8.97 million or \$2.08 a share coupled with a positive cash flow from operations for the first year in the company's history.

The company attributed the loss to the weakness of the dollar as well as a fourth-quarter change in reporting gains and losses on translation of foreign currency indebtedness.

The positive cash flow was accomplished despite net repayments during the last nine months of 1974 of \$18.2 million of senior debt, investments required to support the volume increase of more than \$40 million, operating losses and continued investments made to support future growth, the company said.

The 1973 revenues totaled \$176.92 million with a loss of \$19 million or \$27.63 a share.

Fourth-quarter 1974 revenues were \$59.57 million, a 23% increase over revenues of \$48.44 million in the year-ago period, and a loss of \$2.53 million or 59 cents a share was reported.

Losses for the fourth quarter of 1973 totaled \$13.8 million or \$3.20 per share.

The change in policy of currency translation on foreign currency indebtedness resulted in a charge against income for 1974 of \$2.15 million.

Under the prior policy, translation adjustments on long-term debt were deferred and amortized over the term of debt. Under the new policy, no deferral.

Graham Six-Month Results Up 10%

GRAHAM, Texas - Tape maker Graham Magnetics, Inc.'s six-month earnings rose 10% on a 13% increase in sales over figures for the year-ago period. Earnings totaled \$662,982 or 70 cents a share compared with

of these adjustments is made.

A number of other policy decisions contributed to the loss for the year and the fourth quarter, including write-offs of approximately \$4 million reported in the past quarter.

In addition, actions taken to reduce facilities and personnel levels resulted in significant one-time charges for the fourth quarter and the year, a spokesman said.

Shareholder's equity improved by \$63.18 million from a deficit of \$86.86 million at year-end 1973 to a deficit of \$23.7 million at year-end 1974.

\$602,368 or 64 cents a share in the same period last year.

Revenues reached \$8.2 million compared with \$7.3 million in the first half of 1973.

Results also improved for the second quarter. Earnings reached \$383,008 or 41 cents a share compared with \$349,920 or 37 cents a share last year while revenues rose to \$4.3 million.

Bunker Ramo Fourth-Quarter Sales Boost '74 Revenues to \$314 Million

OAK BROOK, Ill. - Bunker Ramo Corp. reported 1974 revenues of \$314 million compared with \$290 million in 1973.

Earnings for 1974 reached \$6.9 million or 74 cents a share compared with \$4 million or 21 cents a share in 1973.

Fourth-quarter revenues increased to \$75.3 million, from \$74.6 million in the year-ago period. Earnings increased to \$800,000 or 3 cents a share, compared with a loss in the final quarter of 1973 of \$1.3 million or 34 cents a share.

The 1973 earnings have been restated in accordance with a change in accounting which calls for expensing research and development costs as incurred, and prior periods' financial statements are restated to reflect the change.

The new method of accounting added \$500,000 or 8 cents a share to 1974 net income and decreased 1973 net income by \$3.7 million or 61 cents a share.

Prior to 1974, research and development costs were deferred over the life of the equipment or the systems.

Fourth-quarter income for

1974 was affected by including a consideration of \$7.5 million received by the company in a recent cross-license agreement with IBM.

In addition, the company provided \$3.9 million in the fourth quarter for anticipated losses in liquidating assets related to third-party computer maintenance agreements.

SEL Cuts Losses

FORT LAUDERDALE, Fla. - Systems Engineering Laboratories, Inc. (SEL) managed to reduce its losses for the second quarter and six months ended Dec. 27.

The loss for the quarter shrank to \$98,491 or 4 cents a share compared with nearly \$4 million or \$1.55 a share in the same period last year. Revenues leapt to \$4.5 million from \$2.8 million.

For the six months, the firm lost \$208,310 or 8 cents a share compared with \$4.8 million or \$1.85 a share a year ago. Revenues also improved, to \$9 million from \$5.9 million last year.

Honeywell Bull Results Rise 11%

PARIS - The unaudited consolidated Honeywell Bull year-end results show revenues reached \$500 million in 1974, an 11% increase over \$480 million in revenues announced for 1973.

Steady for the first three quarters, the growth rate dropped in the fourth quarter due to two-digit inflation, high interest rates and a general economic slow-

down in European countries during the second half of the year, the company said.

The Series 60 line announced last April contributed to an increase in orders, the company noted, adding nearly \$100 million in business was written for Level 64 equipment manufactured primarily in Angers by the end of 1974.

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• Built-in flexibility for expansion

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Earnings Reports

ELECTRONIC DATA SYSTEMS

Three Months Ended Dec. 31	1974	1973
Shr Erid	\$ 2.59	\$ 3.35
Revenue	30,733,000	28,712,000
Earnings	3,522,000	4,221,000
6 Mo Shr	\$ 5.17	\$ 6.70
Revenue	60,775,000	57,898,000
Earnings	6,860,000	8,122,000

MILGO ELECTRONIC

Three Months Ended Dec. 31	1974	1973
Shr Erid	\$ 2.71	\$ 4.46
Revenue	9,974,000	6,958,000
Earnings	1,176,000	756,000

SUNKER RANO

Year Ended Dec. 31	1974	1973
Shr Erid	\$ 7.74	\$ 8.21
Revenue	214,013,000	290,534,000
Earnings	6,905,000	4,013,000
6 Mo Shr	\$ 15.47	\$ 16.42
Revenue	75,301,000	74,637,000
Earnings	863,000	1,138,000

a related to reflect change in accounting. Includes pretax contribution of \$1.2 million from agreement with IBM and for anticipated losses related to third-party maintenance agreements.

ANDERSON JACOBSON

Three Months Ended Dec. 31	1974	1973
Shr Erid	\$ 5.07	\$ 5.05
Revenue	3,585,100	2,126,600
Earnings	176,715	123,374
6 Mo Shr	\$ 10.14	\$ 10.10
Revenue	9,431,163	6,103,466
Earnings	478,261	323,431

COMPUTER ELECTION

Three Months Ended Dec. 31	1974	1973
Shr Erid	\$ 5.44	\$ 5.55
Revenue	5,415,490	3,962,986
Earnings	584,955	499,818

CONTROL DATA

Year Ended Dec. 31	1974	1973
Shr Erid	\$ 3.33	\$ 3.73
Revenue	1,101,162	948,191
6 Mo Shr	\$ 6.66	\$ 7.46
Revenue	3,725	60,904
Earnings	263,144	277,558
6 Mo Erid	\$ 5.44	\$ 5.55
Earnings	(16,003)	1,538

DATRONIC RENTAL

Three Months Ended Dec. 31	1974	1973
Shr Erid	\$ 5.07	\$ 5.05
Revenue	985,565	1,166,542
Earnings	133,777	46,486
6 Mo Shr	\$ 10.14	\$ 10.10
Revenue	2,026,728	2,373,087
Earnings	6,006	92,935

ITEL

Year Ended Dec. 31	1974	1973
Shr Erid	\$ 5.07	\$ 5.05
Revenue	13,777	14,486
Earnings	133,777	46,486
6 Mo Shr	\$ 10.14	\$ 10.10
Revenue	2,026,728	2,373,087
Earnings	6,006	92,935

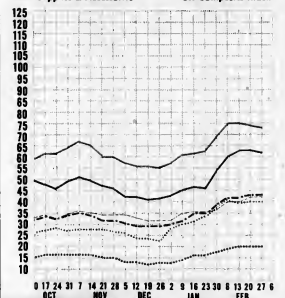
NASHUA

Year Ended Dec. 31	1974	1973
Shr Erid	\$ 5.07	\$ 5.05
Revenue	315,941,000	224,266,000
Earnings	22,371,000	11,550,000
6 Mo Shr	\$ 10.14	\$ 10.10
Revenue	77,448,000	62,223,000
Earnings	2,795,000	3,111,000

affects. Life accounting method for certain inventories for the first nine months.

COMPUTERWORLD Computer Stock Trading Indexes

- Computer Systems
- Software & EDP Services
- Peripherals & Subsystems
- Leasing Companies
- Supplies & Accessories
- CS Composite Index



Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by
TRADE-QUOTES, INC.
Cambridge, Mass. 02139

PRICE-CHANGE										PRICE-CHANGE										
1974										1974										
RANGE										RANGE										
FEB 27										FEB 27										
131										131										
15% COMGE										15% COMGE										
COMPUTER SYSTEMS										SOFTWARE & EDP SERVICES										
N MICROCOMPS CORP	AP-104	84	-3 3/4	-4 1/2						Q ADVANCED COME TEFM	1-7	5 1/4	0	0 1/2						
Q COMPUTER AUTOMATION	2-14	8 1/8	-1 1/8	-1 1/8						Q ANALYTIC DATA NETS	1-3	1 1/4	+1/4	+1/4						
N CONTROL DATA CORP	10-34	1 1/8	-1/8	-1/8						Q AUTOMATIC DATA SYSTEMS	2-14	44	+4 1/4	+4 1/4						
Q DATA GENERAL CORP	10-34	15 3/4	-1 1/4	-1 1/4						Q BARRON ASSOCIATES	1-3	1 1/4	0	0 1/2						
Q DATAPoint CORP	1-5	3 1/4	0	0						Q CENTRAL DATA SYSTEMS	1-3	1 1/4	0	0 1/2						
N DIGITAL EQUIPMENT	44-121	7 1/2	+1 3/4	+2 1/4						Q COMPUTER OPERATIONS	1-3	1 1/4	+1/4	+1/4						
Q ELECTRONIC ANSYS	1-7	2 1/8	-1/8	-1/8						Q COMP ELECTION SYSTEMS	1-3	1 1/4	+1/4	+1/4						
Q ELECTRONIC INSTRUMENT	4-11	6 1/8	0	0						Q COMPTON ELECTRONICS	1-3	1 1/4	+1/4	+1/4						
Q ELMICORP	1-7	2 1/8	-1/8	-1/8						Q COMPTON ELECTRONICS	1-3	1 1/4	+1/4	+1/4						
Q GENERAL AUTOMATION	4-11	5 1/8	-1/8	-1/8						Q COMPTON ELECTRONICS	1-3	1 1/4	+1/4	+1/4						
Q GTE COMPUTER CORP	1-7	2 1/8	-1/8	-1/8						Q COMPTON ELECTRONICS	1-3	1 1/4	+1/4	+1/4						
N HELLERWORKS CORP	4-11	5 1/8	-1/8	-1/8						Q COMPTON ELECTRONICS	1-3	1 1/4	+1/4	+1/4						
Q HONEYWELL INC	10-34	15 3/4	-1 1/4	-1 1/4						Q COMPTON ELECTRONICS	1-3	1 1/4	+1/4	+1/4						
Q IBM	10-34	15 3/4	-1 1/4	-1 1/4						Q COMPTON ELECTRONICS	1-3	1 1/4	+1/4	+1/4						
Q INTERDATA INC	1-7	2 1/8	-1/8	-1/8						Q COMPTON ELECTRONICS	1-3	1 1/4	+1/4	+1/4						
Q MEMPHIS	2-14	8 1/8	-1 1/8	-1 1/8						Q COMPTON ELECTRONICS	1-3	1 1/4	+1/4	+1/4						
Q NASHUA	1-7	2 1/8	-1/8	-1/8						Q COMPTON ELECTRONICS	1-3	1 1/4	+1/4	+1/4						
Q NCR	10-34	15 3/4	-1 1/4	-1 1/4						Q COMPTON ELECTRONICS	1-3	1 1/4	+1/4	+1/4						
Q NORTON CORP	2-14	8 1/8	-1 1/8	-1 1/8						Q COMPTON ELECTRONICS	1-3	1 1/4	+1/4	+1/4						
N PERMABAND	2-14	8 1/8	-1 1/8	-1 1/8						Q COMPTON ELECTRONICS	1-3	1 1/4	+1/4	+1/4						
Q SYSTEMS ENG. LABS	1-7	2 1/8	-1/8	-1/8						Q COMPTON ELECTRONICS	1-3	1 1/4	+1/4	+1/4						
Q ULTRACORP SYSTEMS INC	1-7	2 1/8	-1/8	-1/8						Q COMPTON ELECTRONICS	1-3	1 1/4	+1/4	+1/4						
Q VARIAN ASSOCIATE	4-11	5 1/8	-1/8	-1/8						Q COMPTON ELECTRONICS	1-3	1 1/4	+1/4	+1/4						
Q VARIAN ASSOCIATE	4-11	5 1/8	-1/8	-1/8						Q COMPTON ELECTRONICS	1-3	1 1/4	+1/4	+1/4						
Q VARIAN ASSOCIATE	4-11	5 1/8	-1/8	-1/8						Q COMPTON ELECTRONICS	1-3	1 1/4	+1/4	+1/4						
Q VARIAN ASSOCIATE	4-11	5 1/8	-1/8	-1/8						Q COMPTON ELECTRONICS	1-3	1 1/4	+1/4	+1/4						
N VPRC CORP	50-127	7 1/2	-1	-1						Q COMPTON ELECTRONICS	1-3	1 1/4	+1/4	+1/4						
LEASING COMPANIES										PERIPHERALS & SUBSYSTEMS										
Q COMBOSIS INC	1-7	2 1/8	-1/8	-1/8						N ADVANCED MICRO DEVICES	3-11	5 1/8	-1/2	-1/2						
Q COMPTON GROUP CORP	2-14	8 1/8	-1 1/8	-1 1/8						Q ADVANCED MICRO DEVICES	3-11	5 1/8	-1/2	-1/2						
Q COMPTON INVENTORY CORP	1-7	2 1/8	-1/8	-1/8						Q ADVANCED MICRO DEVICES	3-11	5 1/8	-1/2	-1/2						
Q DATAPoint RENTAL	1-7	2 1/8	-1/8	-1/8						Q ADVANCED MICRO DEVICES	3-11	5 1/8	-1/2	-1/2						
Q ELMICORP	1-7	2 1/8	-1/8	-1/8						Q ADVANCED MICRO DEVICES	3-11	5 1/8	-1/2	-1/2						
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CPU processing
costs 27%



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